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THE
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Madras Presidency.

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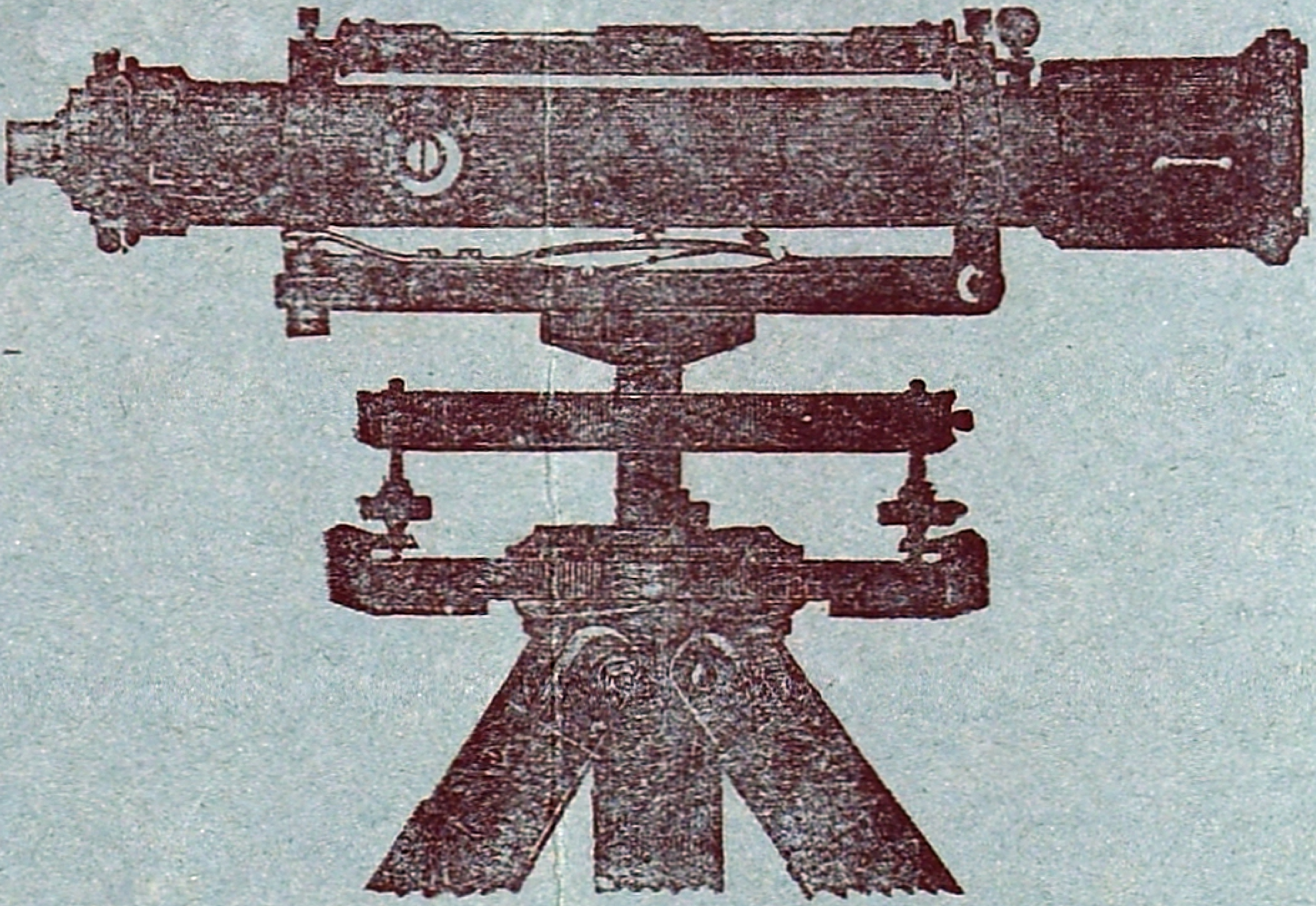

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The Madras Forest College Magazine.

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THE

Madras Forest College Magazine.

Published Quarterly.

Vol. IV. December 1919. **No. 2.**

Visit of their Excellencies to the College.

September 17th and 18th were perhaps the two most successful days in the History of the College. On the 17th at 10-15 hrs. His Excellency Lord Willingdon accompanied by his Private Secretary, an Aide-de-Camp, and the District Magistrate arrived at the College, where he was met by the Chief Conservator, the Board of Visitors, the Principal and Staff, and the Chief Secretary to Government. After the students drawn up in double file had been inspected, His Excellency and all Forest Officers present were photographed with the students.

A move was then made to the Engineering Park where the various apparatus, such as Fire Station, Derrick, Shears, Fuel slide, bridges &c., were explained by Mr. Cornwell, the senior engineering instructor. The site of the Students' Club was next visited, and the foundation stone was laid by His Excellency, the silver trowel with a sandal handle being accepted by His Excellency as a memento of the occasion.

In asking His Excellency to lay the foundation stone of the Students' Club, the Principal stated that the proposoal to build the institution was originally made to Government in 1915 but the financial stringency of the times and the formidable nature of the D. P. W. estimate proved an insurmountable barrier. Nothing daunted by the set back, Mr. Dawson (who during his 5 years' tenure of the post of Instructor at the College was ever alive to the interests and happiness of the students) undertook to collect funds for this project. A large amount was promised by the then present and past students, and a sum of Rs. 247 was realised. In July 1918 Lord Pentland, while making one of his not infrequent and always welcome visits to the College asked if any additional prizes &c., were required, he was informed that there were sufficient prizes but that the absence of Students' Club was a serious disability. Lord Pentland promised to further the project on his return to Ootacamund, and was good enough to take down some notes as to details of cost &c. On the 13th November last year, the news of the Armistice reached the College, and before going down to the town to take part in the public rejoicings, the Principal addressed the Government with a view to getting the project pushed through as an appropriate memento of that happy occasion. In the same month an effort was made to ascertain exactly how much was outstanding and how much was actually in hand. It is to be regretted that 7 months elapsed before the necessary information could be elicited from the individual responsible. Had it not been for these 7 months of uncertainty, there was no doubt that His Excellency would now be opening the Club instead of laying the foundation stone. But the former was, it was hoped, but a pleasure postponed. The Government's response to the Principal's request was both prompt and gratifying and amounted to a promise to contribute Rs. 2000 provided a like sum were raised elsewhere.

In July, an appeal was issued to all Gazetted Forest Officers and old students, with the result that by now Rs 2655 had been collected. Of this sum, the Gazetted Officers had subscribed Rs. 1330, old students Rs. 455, and the present students, the Principal was grateful and proud to say, had raised over a thousand rupees. Of this latter item Rs. 100 had been contributed by Senior Student Nagalingam who thereby became a Patron and entitled to have his name inscribed on the tablet of Patrons of the Club. There was a balance of over Rs. 1000 still due from promises of old students and it was anticipated that within the next month or two the whole of this sum would be realised.

The scheme prepared recently by Mr. Crothers, Instructor now on leave, included one room 50' × 20' containing a Stage (for, the Theatricals were now quite a special feature of the College), a small library, and another room. The plan of this project was drawn by ex-student Sankunni Menon. The estimate and design were then submitted to a Select Committee of which Mr. Cornwell, the present House Tutor was the Chairman. It was found necessary to cut down the dimensions &c., and so far as funds permitted at present, it was not possible to add the Library or Stage. There was thus ample scope for expenditure of further subscriptions. The foundation stone was prepared and put in place by Mr. Hart, the Executive Engineer of Coimbatore Division who despite his arduous and multifarious duties always found time to do the Forest College a good turn if the Fates were propitious. The *Raîson D'être* of the Club was to provide a place where the Students could dispose themselves at their ease and talk on all and every subject except politics. At the Forest College there were no politics. The old Latin tag "*Dulce Est Desipere in Loco*" freely translated by the observation "how sweet it is to slope about." best exemplifies the object of the Club. We all liked moments of relaxation; and it was only right and natural that we should, and therefore, as His Excellency had a long and arduous morning before him, the speaker would detain the Company no longer but would ask His Excellency to honour the College by laying the Foundation Stone of the Club which the speaker was confident would prove a source of pleasure, convenience, and benefit to past, to present and to future generations of Madras Forest College Students.

His Excellency then made the following reply before laying the Foundation Stone:—

"Mr. Cowley-Brown, Gentlemen and students:—I wish to thank you very much indeed for having given me this opportunity, on the first occasion that I have come here in rather an official capacity, of taking a practical interest in the amenities of life and the comtorts of you young men in the Forest College. I understand and I am delighted to hear that you young men yourselves have collected a large sum of money towards the erecting of this club. I am also glad to hear that the old students have promised to give a certain amount. That shows, and I hope I am right in my idea, that there is a feeling, when boys go away, of *Esprit de corps* and recollection of their old school which is always the essence of school life. There is one word I would like to say with regard to subscriptions. I do not know whether you have honorary members. If you have I may assure you that His Excellency the Governor will be glad to give you Rs. 100 for any purpose connected with this building. (Applause). I do not know whethet it is possible for you to have lady honorary members. If it is, I am quity sure Lady Willingdon would want to give you Rs. 100. (Applause). Therefore, in anticipation, I offer you Rs. 100 on her behalf. (Applause). You have made the remark, Mr. Cowley-Brown, that this Club is for social intercourse, recreation and social amenities of life, outside school time. You have also said, and I have on doubt you are quite right, that there was one thing you are quite sure will never be discussed here, and that was politics. Well, I am bound to say that I sincerely hope you young gentlemen, are here to work, and are not going to pay too much attention to politics. I have been at College myself for a good many years, and I did not think about politics then. If you take my advice, although it is an excellent thing for you to know about public affairs, in this country, you need not worry your heads about politics. Wait till you are much maturer in years than at the present time.

"Well, I have just a few words to say to you on general matters of forest administration. I do not know whether you know that the Governor, is as far as the Goverment is concerned, the departmental head of the Forest Department. I, for six years, was the head of the Forest Department in Bombay and it gave me a great deal of interest, a good deal of occupation and I think we progressed a good deal. Now, I want to tell you, gentlemen, in the presence of your Chief Conservator, what I feel about forests in this Presidency. You have a thing which we had not got in Bombay, a fine Forest College. But in Bomay they have got what you have not got here, that is a considerable development in the forests which I do not see in Madras. To me, the Forest Department is one of the most important departmental developments which we have got to undertake. As far as I am individually concerned, and I say so in front of your Chief Conservator, any matters of development which he wishes to put forward I shall always support in every conceivable way I can. Let me tell you, if as I believe the forest industry is going to be one of the greatest industries of the country in a few years' time and the Madras forests have to develop, it is essential that you should profit by your instructions here and become efficient, so that you may be really useful officers and help us in their development. Let me say, I shall always take the keenest interest in your education and your welfare and you will probably find your Governor will be often running down to Coimbatore to find how you are getting on." (Applause).

One of the Provincial Officers' bungalows was next inspected, and the project for adding 2 rooms each 20' × 20' and 2 bath rooms was accepted. These improvements will give the accommodation that can be reasonably expected for the rent leviable on the pay of the occupants.

The party now reinforced by the presence of the Surgeon General motored to the Sub Assistant Surgeon's quarters, the Clerks' houses and the College well. The out-standing problems were satisfactorily adjusted, *in situ*.

The next item on the programme was the planting of a ***Bassia longifolia*** near the Museum, and next to the *Ficus Benjamina* planted by Lord Pentland in 1915. Eventually this plot will be known as Governor's Grove. Half an hour was then spent in the Museum, and after the situation had been explained, His Excellency decided that extension by wings (one of which should be convertible into a Prize day Hall) was very necessary.

At the Gymnasium the party met Her Excellency, Lady Willingdon, Mrs. Cox, Mrs. Cowley-Brown, Mrs. Campbell, and

Mrs. Gifford: they had previously visited one of the Hostels. A demonstration on the Parallels, Rings, Horizontal bar, and in groups was given by a picked team of students led by Senior Student Venkateswarulu and instructed by Havildar Kadir Baksha. Venkateswarulu concluded the exhibition with several grand circles. His Excellency complimented Mr. Cornwell and the Havildar on the excellent training evidenced by the exercises.

Her Excellency then planted an "*Achras Sapota.* (Sapodilla)" tree next to that of His Excellency.

The main building of the College was next inspected, and while the Ladies escorted by the Staff visited the Museum, His Excellency discussed matters with the Board of Visitors, the Principal, and the Chief Secretary. Their Excellencies then lunched in the Principal's house, where the party was joined by Mrs. Jackson and Mr. and Mrs. Wimbush. Shortly after 4 p. m. Their Excellencies returned to Coimbatore.

On the 18th the Athletic Sports were honoured by a visit from Their Excellencies, who thoroughly entered into the fun of the fair and evoked great enthusiasm by their obvious enjoyment over simple diversions. Her Excellency, who took a practical interest in the Log Cutting and other competitions herself organised a new competition—the Willingdon mêlée,-i. e., a sack fight the Department versus the World. This event will now be standardised. The satisfaction in defeating the world was tempered by the unfortunate accident that befell General Gifford the Captain of the World's Team, who fell and fractured two ribs. Her Excellency presented Mr. Cornwell the sole survivor of the struggle with a silver pencil case, and the Forest Team as winners literally "took the biscuit."

The following records were established at this year's meeting:-

100 yards Flat Race.	Old Students.	C. S. Nanjappa. 12 seconds.
High Jump.	J. A. Muliyil.	4 ft. 11$\frac{1}{4}$ inches.
One Mile.	M. B. Subbiah.	5 Min. 32 seconds.

In asking Her Excellency to distribute the prizes to the winners, the Principal remarked:-"We are indeed grateful to Their Excellencies for making the effort to visit us a second time after a heavy and tedious programme on the Estate yesterday. It is moreover a special compliment that is being paid to us today. For, this is the first occasion on which the Governor of Madras has been present at the College sports and yesterday was the first time that the Forest College Estate had been honoured by a visit from the wife of a Governor of Madras. But we are further blessed today, for, I want you students to realise that all ladies have the "Forest eye". I know it. For 5$\frac{1}{2}$ years, I have known it, that all ladies are possessed of that gift so essential to members of our service, namely the "Forest eye"—the eye that is quick to note sins of omission and sins of commission and yet equally prompt to recognise merit when it is earned. Those of you, students, who are married doubtless know it already; those of you who are not married will find it out for yourselves some day. I don't think that much escaped Her Excellency's eye yesterday, and I anticipate that the new light brought to bear on our problems will operate to the marked and early benefit of the College.

"I am particularly glad to see so many Indian ladies and gentlemen today. For I want them to realise something of the conditions of a Ranger's training and especially of the difficulties with which he is faced on leaving the College. He comes to us the product of his late environment. We here endeavour to impress upon him such favourable conditions as we are able to assemble. When he leaves us, his actions will to a great extent be influenced by his future environment. And I would wish that some of the professional orators in the Legislative Council would realise that those local conditions sometimes make it none too easy for the Ranger to do his bit.

"To the old students especially we offer a hearty welcome, for, it is to a great extent, the old students who made our traditions; and it is for you, present students, to maintain, to continue, and to improve on them.

"We have had our little ups and downs of furtune within the last few days. The inclement weather has demonstrated much more adequately than any scriptory effort of mine how poor and insignificant is the accommodation afforded by our wartime pavilion. Then again our refreshments today are not what we should like them to be. The fact being that though the railway receipts have materialised the goods have not, and I must therefore ask you to ascribe to the vagaries of the Railway Company and not to any lack of good intention on our part, the deficiencies of hospitality.

"Turning to the sports this afternoon, we have produced no Flyers but on the whole what is much better, namely, a fair average exhibition of effort. There was not enough training this year but in future we shall take steps to remedy this defect. The Richmond Cup for the largest number of marks earned at these sports has been won by student Juriansz. Athletic colours have been gained by students Juriansz, M. B. Subbiah and J. A. Muliyil. I have to thank those ladies and gentlemen who kindly officiated as Judges, Starters, Time-keepers and Referees not forgetting the lady handicappers of the babies. The Referees' task was almost a sinecure, as I think in all well-regulated meetings it should be.

"We are greatly indebted to several generous donors of prizes. Her Excellency has given a prize for the log cutting competition: the Mannarghat Mupil Nair, a Silver Cup for the Mile race, the Chief Conservator, the Prize for the Half-Mile Invitation Race, Mr. Longrigg, that for the hurdles, and Mr. Cornwell a silver cup for the Quarter. But we are indebted to Mr. Cornwell for far more than his prize. For it is due to his expert knowledge and indefatigable energy that we have made of the meeting such success as may appear to be merited. Mr. Cornwell is himself a first class athlete, and as Vice-President of the Athletic Club he has been the mainspring of the meeting from start to finish. As His Excellency observed yesterday with reference to the Gymnastic display he has indeed been the power behind the Throne.

"But time is fleeting and Your Excellencies have yet a rail journey before you, and therefore I will restrain no longer the impatience of those to whom prizes are due; but I will only say "please come again," and I will now ask your Excellency to complete the happiness of the day and to fulfil your promise by gratifying the successful competitors in presenting to them the rewards they have gained."

His Excellency, in replying, said, that he was delighted to find that this was the first occasion when a Governor attended a Forest College sports, and sincerely hoped that "Forests" would attack the World as on this occasion, and defeat them (Applause.) His Excellency knew well that Lady Willingdon was one of those people who after an experience of some years had the gift of a forest eye, and he would appreciate her sense of quick perception. As she was also an honourary member of Students' Club, His Excellency hoped that with the influence of Lady Willingdon's forest eye the students would learn to do their duties thoroughly well and thereby push forward their College. After thanking them all for their kind reception His Exceliency hoped that he and Lady Willingdon would visit the College often, especially on sports days.

Their Excellencies then said good bye to by far the largest company that has witnessed our sports and took their departure amidst the regrets of those to whom their bonhomie and friendly kindness had brought so much pleasure during the past two days. The band of the Vellore Police School played an admirable selection of music. The Police arrangements under Mr. Blackstone D. S. P. and Sergeant Jones were thoroughly efficient.

Their Excellencies have presented their photographs to the Students' Club, and to the Museum.

His Excellency has expressed his great satisfaction with the tone, methods and results of the College.

So ended two cheery, busy and profitable days.

Sind Forests.

Forests in Sind have been in existence since the days of 'Mirs' as some areas with tree growth were always maintained to invite game for the purpose of their hunting and shooting and as such they were generally called 'Shikargahs'.

The increase in the area under forest began from the year 1878 when the Indian Forest Act now in force was enacted subjecting the forests to a more or less systematic protection and providing for the afforestation of new lands. Since then the area under forest control has continued to increase as most of the unassessed, unoccupied lands at the disposal of Government and suitable for forest purposes are being brought under forest control as soon as they are found available.

Legal position of Forests

All the areas at present under forests have been declared Reserved Forests under Section 19 of Indian Fores Act and the Rights and Privileges in them duly settled and recorded as required by Section 4 of Indian Forest Act. But no rights or easements have been admitted or allowed in the forests maintained from the days of 'Mirs' as no such right existed or can be alleged to exist in them in favour of any person.

Division of Forests and their control.

The total area of Sind Forest circle comes to about 740,000 acres and is divided into five divisions, namely, Karachi, Hyderabad, Larkana, Sukkeer, and Stukarpur. The circle office is stationed at Karachi and is in the charge of a Deputy Conservator of Forests. Each Division is under the control of a Divisional Forest officer of a rank not less than the Extra Assistant conservator of Forests. The Divisions are called by the names of their respective Head Quarter towns which are also usually the Head Quarter Stations of collectors and other District officers But the forest boundaries of each division seldom coincide with those of the Revenue collectorates. Each Division is made up of four or five ranges. A Range is composed of some ten to twelve forests and the forests in turn comprise one or more felling Series.

Types of Forests and their situation.

Sind forests are generally classed as under :—

I. Riverain, also called Riparian; *II. Inland.*

I. Riverain Forests are those which fringe on either bank of River Indus or are situated so close to it that they depend for their irrigation solely on the river spill. This belt of forests begins from 'Roanti' (just near the place where the river leaves Bahawalpur state and enters British territory) and goes so far as Keti-Bandar (near the place where the river enters the Sea) a distance of about 5 to 6 hundred miles. These forests are the typical forests of Sind and are more contigiuousin Lower Sind than in Upper Sind.

II. Inland Forests.

Forests which are away from the river, and are irrigated by sluices in Public Works Department embankments, and canals, are termed Inland Forests. The water supply of these forests is in no way assured, for the forests have a claim to the surplus water in the canal only. Therefore, the Forest sluices are allowed to work to their full capacity during abnormal floods. Consequently these forests are poorly stocked.

Species.

The following are the species growing in Sind Forests:—

Dalbergia Sissoo	Called	Tali.
Acacia Arabica	Do	Babul
Prosopis specigera	Do	Kandi
Papulus Euphratica	Do	Bahan
Tamarix gallica	Do	Lye

Dalbergia Sissoo.

It is not the naturally growing species of Sind forests but is artificially raised generally by transplanting. It is the most valuable species of Sind Forests as it is the only tree which yields a good amount of timber. Owing to the vagaries of the Indus it is not practicable to raise 'Talis' on river banks or in its proximity so as to avail of flow irrigation. Therefore 'Talis' have been planted and raised by lift irrigation over an area of about 200 acres, but the results have not been quite satisfactory. It will be possible however to encourage Tali plantation to a greater extent and with a better chance of success when the proposed 'Sukkeer Barrage' scheme is completed.

Acacia Arabica.

Acacia Arabica is the principal indigenous species of Sind Forests. It is a light demander & shallow rooted tree ; reproduces from seed and easily succumbs to the effect of drought. It needs something like a foot deep water for about three to four months of the year and complete drainage. Therefore its is a habitat mostly of riparian forests where all its demands are adequately met with on higher levels it is usually found fringing the backs of depressions or water courses. It is affected to a great extent by frost, hence, it is found growing naturally under the shade of thin *Tamarix*, which serves as a nurse to the young seedling, but subsequently when Babul is established it overtops and kills the nurse. It has a tendency to grow gregariously and sometimes in its sapling stage forms so dense a crop, through which no man and scarcely any light can pass.

Thinning operations are therefore carried out in such areas from 12th to about 20th year of its age. It is worked on a rotation of 30 years. The bole of the tree and some of its straight branches yield a fair amount of timber and rafters; the rest is converted into fire wood or charcoal. Its regeneration is effected either by broad casting or leasing out such lands to cultivators on the condition that they will raise alternate strips of Babul in the first two years and in the third year broad cost seed over the remainder along with the cereal crops. The latter process is adopted in cases where the level of the ground is a little higher or to keep down the grass which is very persistent, and the method has been found to be very beneficial.

Prosopis Spicigera.

It is a deep rooted tree and can thrive well even on percolation water, though it is not insensible to the advantage of a good water supply. When once established it can stand well the effects of drought. It therefore forms the principal crop of Inland forests where it lives on subsoil moisture derived through its deep roots. It yields a good quality of fire wood and charcool and more easy to work than Babul. It reproduces abundantly from coppice but is also artificially raised by broad casting or sowing with cereal crops in the same way as Babul.

Papulus Euphratica.

It grows only on newly formed soils by the action of the river and principally on Sandy or Sandy loam soils; shallow rooted tree, easily affected by drought; Grows rapidly and puts on a girth of about 2 to 3 feet in about 15 years' time and if not felled at that period it soon begins to get hollow. It is found pure as well as in mixed state, but in the former state it seldom extends our a large area. As the level of the freshly formed soils is being constantly raised by annual silt deposits, it gradually disappears, being replaced by *Acacia Arabica* or *Prosopis Spicigera* according to the conditions of soil and irrigation. Its wood is light and soft and is used for rafters or lacquor work.

Tamarix gallica.

Is the inferior tree of sind forests. Reproduces abundantly from seed and coppice; Found almost everywhere in the forest as it can stand conditions both too dry and too moist. In the former state it usually assumes a bushy form but in the latter it grows very well. Its wood is light and is used mostly for firewood but when perfectly sound and straight, rafters are made out of it for cottage roofs.

Revenue Rotation etc

Sind Forests yield an annual revenue of something like Rs. 700,000, and are worked on a uniform cycle of 30 years for all the species, notwithstanding the different rate of increment in different species, owing to the reason that the constant shifting of the river to and from the forests bring about a correspondent change in their area in riverain forests. This in turn affects the distribution of species, for, an area covered with a dense growth of Babul may very soon be transformed into *Baban* or *Kavdi* forest if rethrown by the river after eroding it, owing to the change wrought by the river in its physical and chemical composition as well as its ground level. The Inland Forests are no doubt more stable than the riverain ones but as they depend for their irrigation on the surplus water of the canals and the river, a continuous low level of the river for some years would mean a period of drought for them and this would naturally result in the retardation of the existing growth. Owing to these complicate circumstances this uniform relation has been prescribed for all basing it on the average conditions.

In short, the primary duty of a Ranger in Sind is to make a complete study of the following points concerning his forests :—

(1) The sources of the water supply (2) water channels leading water to the Forests, if any, (3) their capacity and the average quantity

actually received, and (4) The level of his forests, so as to be able to make a judicious use of the available water supply.

K. R. Moorjani,
Junior Division,
Sind circle.

A Lecture by Captain Irwin on his Experience in Flanders.

On the 19th September 1919 Captain Irwin M. C. the Forest utilization officer, delivered a very interesting lecture on the above subject in "Gamble" at the Madras Forest College. He dwelt at length on the details of mining carried on the front of the infantry lines. His description of the construction of shafts to find out the mining activities of the enemy was instructive. At the end of his lecture he explained the doubtful points raised by the audience.

Shafts, their construction, object and uses:- Shafts are narrow deep pits dug into the ground vertically to post the listeners underground with a geophone to enable them to listen to the mere scratch of the earth by the enemy with clear distinctness. The sides of the shafts, are protected with durable timber. In certain cases, shafts, after reaching a certain depth vertically, are taken horizontally so as to prevent observation by the enemy. The inrush of air down the vertical shaft will go round the horizontal shafts and the listeners will thus have no inconvenience for want of air. The opening of the shafts on the ground level will be covered and camuoflaged, to prevent detection by enemy aeroplanes. In addition to this some men are made to appear to construct bogus shafts or shaft materials are left scattered at noticeable places to set the enemies on the wrong line, while all the time real shafts are constructed elsewhere. In most cases shafts are connected with the camp by trenches for men to come under cover and work. In such trenches sometimes men have to wade along slough and mud knee-deep.

As soon as the listeners suspect any enemy mining activity, the direction from which the sound emanates, is determined by prismatic compass from many points. These readings are then plotted and the point at which most of the rays intersect is decided to be the line along which the enemy is mining. Immediately action is taken to bore underneath the enemy mine and blow it up. This work of countermining is done as quickly as possible and also in a gentle way so as not to allow the enemy to spot out our activity. Sometimes countermining has to be done so near the enemy line that light digging with a crowbar is to be avoided and earth is removed bit by bit by pushing in the end of the crowbar gently to a very inappreciable depth. In this way the whole intervening space between the two fighting lines is dug up by a net work of underground passages and mines are laid in strategic places. It even happens that the mines of the enemy are reached. In such cases charges laid by the enemy are carefully removed and placed as countercharges in defferent places. In removing the enemy mines great caution is required as the detonators of the charges are connected with a system of wires the centre of which may be in any unsuspected place. Any careless handling of anything found in the trench or treading will result in blowing up the whole system of mines. In another case one British

Soldier actually dug into the enemy mine line and there having come face to face with an enemy soldier killed him, walked through the enemy mine line and returned back with the enemy charges. (The bravery of such souls is beyond praise.)

The difficulties of men in the front. Men working in the mines depend for rations from the camp along the trenches and when the supply fails to reach them for some time death is inevitable; cases have occured in which men have heroically stuck to their duties in the face of starvation and the fingers of such men were found fleshless the same having been sucked up in the last moments of life.

Training of German and British Soldiers. German Mines were elaborate, and regarding men the general experience throughout the war was that they acted under orders. Once the source of order is endangered the activity of the whole line ceases. This shows that the training is no better than that of automatons. But in the British line the experience is otherwise. Once the control is lost some one else rises to the occasion and the army is led. Such is the contrast in the training; and it is no wonder that Germany lost in spite of its strong man power and that the British won with a small army.

T. M. DORAISAMY PILLAI,
9-10-1919.

[The great point of Captain Irwin's instructive lecture was that he gave us in graphic and picturesque language, the first hand experiences of an officer who *did* things instead of writing about them. His work constantly called for instant action, and a minimum of reports. As such, the pleasant evening spent with him was of the utmost benefit to embryo rangers, whose tendencies are often just the other way. The lecture was delivered without notes and in free and vivid language that made each scene or crisis live before our eyes. At the end, Captain Irwin descended from the platform, and the students were 'all over him' at once in their thirst for information as to further details. We hope it will be possible, subsequently, for Captain Irwin to come and talk to us still, more informally at the Hostels or in Camp. He is assured of a hearty welcome.]—Editor.

Root suckers in Dalbergia latifolia.

During my three years of service in South Kanara District in the two Ranges of Puttur and Kasaragod, I have been closely watching the natural regeneration of *Dalbergia latifolia* and I could find very few seedlings under seed bearers probably because there was very little light admitted to the Forest floor owing to the thick shade of undergrowth. Where there is sufficient light, but on entirely open space Dalbergia seedlings come up under parent trees in moderate proportion. Where the roots of these trees are injured by the raking up of the soil either by wild pigs or in road cuttings, root-suckers spring up profusely and with great vigour reaching a height of 3 to 8 feet in 6 months where the soil is rich in humus. In an improvement felling area of my range, I happened to observe a peculiar sort of reproduction by root suckers. In compartment 3 of Parappa Working Circle, improvement fellings were carried out in 1918—19, and according to the prescriptions of the working plan, only mature trees dead or dying, illformed or defective, and of and above a certain girth are felled. Rosewood trees are very sparingly marked for felling and in the course of felling, a very old top dead Rosewood tree was felled in the month of December 1918. The tree was so defective that no log could be obtained. At the time of felling, seedlings were entirely absent all round the tree. After about a week of the outburst of the monsoons in June 1919 small seedlings appeared here and there and I thought them, to be germinations from seeds which escaped my notice at the time of marking. During my inspection of these seedlings last week, to my surprise, I saw the whole space of about 2 chains in diameter covered with a thick carpet of seedlings as occur under Hopea parviflora trees. Now I minutely looked into their origin and found them all to be root-suckers. The root system was not interfered with in any way and even wild pigs have not visited this place. The height of these seedlings varied from 6" to 2'. This spontaneous reproduction is noticed only in the case of this one tree though there are several old trees similarly felled in the same year in the same compartment. The coppice shoots that sprouted from the stump are all stunted and lifeless. I shall be thankful if any of the readers of the College Magazine will kindly enlighten me on this point.

K. C. JOSEPH,

5—9—1919.

[A reference to Pages 166 to 173 of Volume III No 3 of the Magazine will throw some light on the point..........Editor.]

Random Notes.

Recruitment of Guards: A number of guards have to be recruited under the new scheme which has lately been sanctioned by the Government. It is expected that Range Officers and District Forest Officers will be flooded with petitions for the appointment of guard's posts. I would suggest that there is no use of selecting candidates from the applications received. We want men with common sense, good physique and moderate educational qualifications. The best method, it seems to my mind, would be to advertise for men, the selection to be made by a committee of two Forest Rangers, presided over by the District Forest Officer. Double the number of candidates required for appointment at a time should be selected, and they should be examined in such subjects as reading, writing and arithmetic, and also in physical feats, as running half a dozen miles, cutting trees, clearing lines, digging pits and so forth. To test their intelligence they must be asked to write on any simple subject relating to Forests. Those who proved themselves to be up to the standard in these 'tests' should be selected, the higher in the list immediately appointed and the rest kept in the reserve list for future appointments. In view of the enhanced prospects before them and the better kind of work expected of them, I should think, a system of recruitment as suggested above is highly desirable.

* * *

***A Rangers' conference*:** A Rangers' conference is a desideratum in the Madras Presidency. The Madras Forest College has now trained a number of rangers, and in a year or two we shall probably have no range in this presidency unmanned by a trained ranger. In the College we have been taught the elementary principles of 'everything' that is required by a Forest officer. The College expects us to develop what we were taught within and without its walls. Each one of us would be learning one new thing or other in our practical life; and what is stale to one may be a revelation to the other. The Government are very much interested in the development of the Madras forests; and hardly a blade of grass or a branch of wood of any use should be left hereafter to rot in the forests.

Each ranger will have his * say on his interested subject; as such it is quite essential that, at least once in a year we all meet in a conference at Coimbatore on the last day of June, the prize distribution day of the College and the subsequent two or three days in July, and read papers on our interested subjects and have them discussed under the presidency of the heads of the department who assemble there during this time. Now that our pay and prospects are improved, none among us would grudge to spend a few rupees for 'a feast of reason and flow of soul'. And when we have demonstrated our usefulness in the direction, the benign Government would not grudge us travelling allowance, at least to those among us who intend reading any useful paper or any useful subject at the conference. As friends we lived in the College; as friends we parted but let it not be a parting for ever.

* * *

The future of tanning barks: Leather industry in India is now engaging the attention of the industrialists and several factories have been started for curing and tanning leather within India itself. The barks of *Cassia auriculata*, *Acacia decurrens*, *Acacia dealbata* and *Acacia melanoxylon* have been tested and found to be rich in tannin. It is expected that in view of the increased revival of tanning industry in India, and the competition from foreign countries, exploitation of raw produce for tanning purposes, would be on a scale which, had hitherto no comparison. The supply of the raw produce is a problem that could be tackled only by the Forest department. In commensurate with the large exploitation we are going to have, steps should be taken to grow these species in extensive areas. In South Kanara, there are extensive tracts of lands in the North Mangalore Forest division on the slopes of the Mysore Ghats which were intensely kumeried prior to reservation about 20 years ago. Now what we have in these areas is a rich legacy of creepers, weeds, canes, useless and unsound soft-wooded species which are of no good; and the future of these thousands of acres is not enticing to the forester. I would suggest that these areas may be kumeried once again; and sowings of these species experimented upon. A small beginning may be made and if the results are encouraging we can extend our areas. At the instance of M. R. Ry. A. R. Narasimha Iyengar Avergal, District Forest Officer, North Mangalore, I have sown Cassia auriculata seeds obtained from Coimbatore, in about 2 acres in Sukady reserved forest in Shankaranaraina range. The growth in these 2 acres was only scrub jungle previous to its cutting. If the sowings of the above species result in success, the extensive Forests above referred to would be paying as bark could be systematically exploited for tanning and the rest of the stuff for fuel.

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* [While welcoming the suggested conference, we have to point out to the Rangers that the College magazine is another medium enabling them to be in touch all round the year, with their professional *Confréres*. Any Ranger can have his say, at any part of the year, in the magazine.]—EDITOR.

* * *

Under-planting in Nilambur :— I am glad that I mooted first this subject in the pages of this journal; and in concluding my note on this subject I had stated that I was 'conscious of having attempted the discussion of a problem not easy of solution.' I thank Messrs. Chaikku and Umapathi Mudaliar for raising discussions on the subject. I should indeed have been more thankful to Mr. Chaikku if he had my article before him for reference when he wrote his on the subject. I also thank the Editor, for his note that 'I do not blame the wind'. In the absence of my article before him Mr. Chaikku says "The writer does not however explain how this state of the leaves contributes to a reduction in the humus on the ground. If he thinks that by virtue of this easily breaking nature, the leaves disintegrate and get easily blown away by wind, I have but the same answer to this, as I have given against Mr. Mudaliar's theory of the wind." I am not, however, to explain statements which I have not made.

"The objects which those responsible for the attempts at mixing teak with these other species had in view, was, I think saner, surer and not very far to seek. While the white ants leave the ground bare of all dead vegetable litter, the pure crop of deciduous teak, leafless during the hottest months expose the soil to the baking heat of the sun for a considerable period of the year. So far as I understand, what they feared was the deterioration of the soil with regard to its physical properties etc." "The idea that underlay the attempts at the mixture and the idea that underlay under the proposed underwood to teak in Nilambur plantations, is all, I think to raise a leaf cover." "Tbey fear that by deterioration in its physical properties, the soil may not be able to bear the same intensity of growth on a second rotation as on the first."

I have put Mr. Chaikku under inverted comas and now I shall put myself under them with reference to this subject. [Vol. 1 pages 16—17 of the Journal.] "This would merely be the effects of exposing the soil to direct sunlight and the drying action of wind, as usually happens under a pure even aged crop of teak." "I venture to suppose that a soil with a uniform even aged deciduous crop throughout its whole period of development would not have contributed anything—taking the factors of the locality as well into consideration—for the betterment of the soil." "Even though the soil may be very fertile to begin with; to maintain its fertility should be the forester's anxious care as otherwise the yield of timber per acre must decrease with the age of the crop." "Those responsible for the attempts at mixing" would probably have feared this also; and there is no reason to believe that their only fear was that "the soil may not be able to bear the same intensity of growth on a second rotation as on the first." If they had feared the deterioration of the soil and a decrease in the yield of timber per acre in the same rotation viz the first, I would not be found fault with, if I say, their view would have been still "saner". I am sorry I was not so very explicit as Mr. Chaikku to say "pure crop of *deciduous* teak, *leafless* during the *hottest* months exposes the soil to the *baking* heat of the sun."

Then again to put myself in inverted comas "The best means at hand in conserving the productive capacity of a soil under a deciduous species like teak is underplanting with ever-greens or semi evergreens which would be in leaf when the teak would be leafless, protect the soil against exposure during the warmest months of the year and provide sufficient vegetable mould for its enrichent by the annual defoliation of the leaves.'

The above quoted passages from my article would show that I had not gone far to seek the "saner and sounder view". I went only so far as Mr. Chaikku went; but I went two years earlier than Mr. Chaikku; and I went from Coimbatore to Nilambur as a Madras Forest College student; but he had not to go anywhere as he had been in Nilambur itself for the last two years or so. "Defoliation by insects" is not new to me for I had already advanced this theory in my article.

Top ends and branches of teak trees in a teak plantation whether 'left by thinnings' or any other operation are not to be much depended upon in the formation of 'constituent elements.' The time of leaving these in the forests is well nigh over; and what we now want is to make use of every bit of any valuable tree. I understand that there are proposals for laying out tram lines in Nilambur teak plantations; and we have already had the appointment of a 'Forest Utilisation Officer' for the Madras Presidency. While matters are thus rapidly advancing, I believe that a profitable industrial use of the top ends and branches of such a valuable tree as teak is not 'far to seek.'

I did not 'quickly get to discussing suitability of species' as Mr. Chaikku thinks; but I did so only after stating all the reasons, in no way, a whit less than what he stated in his article on the subject. But I mentioned the species suited for underplanting in the same article after stating the requisites such species should have; and did not leave them for another article as I had no Mr. Mudaliar then.

No anxious attempt has been made by me — I don't know about Mr. Mudaliar — to mix teak with certain other species. Species for underplanting should have certain requisites; these were mentioned and then those species with such requisites also mentioned.

Of course to a College student it was not possible when he had gone there during his tours to get the "full history of the experiments carried out in these attempts" to make them 'interesting'. However, I shall read with interest "the full history of the experiments" to know which Mr. Chaikku had over two years' service and experience at the spot, and therefore could be written without any 'anxiety'.

* * *

Enquiry into Forest offences: Personal enquiry by Range Officers into cases reported by their subordinates is not possible even in one out of ten cases in a range where forest crimes are rife. It is a known fact that unscrupulous forest guards report cases against certain villagers out of ill-will or to defend themselves against charges of illicit removals of forest produce not actually detected by them. In doubtful cases, a personal enquiry by the Range officer would help a good deal to arrive at the truth of the Guard's report; but there are a number of instances in which the accused have failed to appear before the Range officer in spite of notices served on them. The Forest guard knows that in an enquiry of this kind truth will come to light; and he is clever enough to induce the ignorant accused to stay away by throwing some bait; and the Range officer's report to his District Forest Officer is submitted incomplete. In the Abkari department any offence reported by a Sub-Inspector is enquired into by an authorised Assistant Inspector or Inspector before the final report is submitted to the Assistant Commissioner. Those officers are authorised to summon accused in Abkari cases; and any failure on the part of the accused to appear before them for enquiring will bring him to serious trouble, or a warrant will be issued against him. The Abkari law allows this. If an Assistant Inspector or an Inspector could be authorised to do this, I see no reason why in a forest case, the Range officer should not be so empowered. This will be one of the methods to prevent corruption among lower subordinates and an incentive to villagers to approach the higher officers. Such enquires may do a good deal to bring to light many of the vagaries of the unscrupulous forest subordinates.

C. KARUNAKARA MENON,
Range Officer,
Sankaranarayana range.

The Dispersal of Fruits and Seeds.

Often has it been dinned into our ears in the lecture rooms, and often has it been shown to us in our various tours that the struggle for existence is not a phenomenon that is confined to animals, but that it extends even to plants. It is manifestly an advantage to the species that the seeds are removed some distance from the parent plant as it gives a better chance for the young seedling in the struggle for existence. This is so because of the removal of the competition to a certain extent which otherwise it would have with others of its kind in the matter of food, light, &c. Even amongst us, going on excursions, the Instructor leading at the head, and lecturing all along on all important points he notices on the way, how often has not the stronger student pushed the weaker aside in his eagerness to keep himself within hearing of the Instructor. Still the weaker only smiles, and avoiding the crowd, and rushing through the scrub jungle, if the path is narrow, and running if left far behind, manages to be within hearing of the Instructor. This we owe to the power of movements God has given to animals. Thank God that he has not bestowed this gift on plants as well, as otherwise we would have had a hard task in getting them, and even fuel one of the necessities of man would have been denied to us. Then by what means do the plants manage to remove themselves from the parents, and escape much of the competition? Many a time have been told in lecture rooms, and many a time have we read in our Botany text books that wind, water, and animals, act as a medium for the dispersal of seeds. This is only a theory. "More practical" and "less theoretical" is the cry in the Madras Forest College. When this is so, how far have we been able to see practically the various way by which the seeds are spread?

In Nedungayam, we saw *Impatiens* (and, *Oxalis* in our own College compound). The fruits of these when ripe, become extremely turgid, burst open and eject their seeds with some force, and thus throw them some distance away. The siliqua of *Brassica Juncea* and the capsules of *Ricinus Communis* are examples of this kind, we noticed in Komuttiyeri and Walayar. Besides, *Strobilanthes*, found growing gregarious in Mundanthorai, we noticed many species of Acanthaceae, forming an under-shrub in almost all the forests we visited so far. The fruits of these are elongated, with a hardened placenta, and it was not without surprise, that some of us looked at the seeds being thrown out by the hard bristle like funicles when the fruit was pressed a little. Another example of a similar mechanism we have practically seen is that of *Justicia* in Walayar and *Ruellia prostrata*, in our College Estate, both of which, when the pericarp is wetted, opens out with a jerk, and the funicles that lie bent within the ovary straighten out, and in doing so throw the seeds some distance away. Especially the latter, *Ruellia prostrata*, will not be forgotten by some of us, who had the bitter experience of having had the fruit burst out in, and the seeds thrown about, the mouth when wetting the pericarp in the mouth.

Though not quite a familiar example, we noticed the legumes of *Acacia Suma*, *Acacia Sundra*, *etc* in Walayar, burst with a twist. *Peltophorum ferrugineum* in our College Estate is *one* of this nature. The bursting of these legumes with a twisting motion is a sure indication of the seeds being hurled away from the parent. This is not all. There are numerous examples of this kind, we have noticed in our various tours, but to descrihe them all, will be voluminous and therefore I confine to a few examples.

Achenes bearing pappus is a character of Compositeae, and the examples of this are common everywhere; and in our own college estate, we have seen *Tridax, Eupatorium* & c. fruits blown by the wind easily. Still easier it is for the wind to blow the seeds with fine hair like that of *Cryptolepis Buchanani, Dæmia extensa, Calotropis gigantea. Dodonea viscosa, Cardiospermum helicacabum, and Physalis* are sufficient to illustrate the winged and inflated fruits which the wind finds no difficulty in carrying with it.

Among trees, the most important, Teak the fruit of which though heavy, the persistent calyx, acting as a balloon, helps it to be blown off the parent plant. *Hopea, Pterocarpus Marsupium* and *Hardwickia binata* have winged fruits. In Nilambur, and Kodimadi, we saw thickets of young saplings of *Hopea* about 100 yards away from the parent plant. Rosewood, *Vengai* and *Hardwickia binata* seedlings were noticed well away from the parent plants in our various tours, and of *Vengai* was particularly marked in Mundanthorai M. F. C. experimental plot in which last year when enumerating the *Vengai* seedlings, some were noticed about 150 ft. from the mother tree.

The *Vengai* fruits drop off late in March and April and the featherlike wings take fire quickly, and is a great source of danger to our forests, if the tree happens to be by the side of the fire line and outside the reserve, and the fire line not wide enough. Should any fire break out in such a place, in all probability, the fruit catches fire and is blown far into the Reserve, by the wind, that is naturally created by the unequal heating of the atmosphere, caused by the fire itself, and of this I had a personal experience in Coorg.

Of the trees bearing winged seeds, may be mentioned *Oroxylum indicum*, (plenty of these, we noticed in Walayar); *Holarhena antidysenterica, Bombax malabaricum,* and *Wrightia tinctoria* are common examples of seeds bearing fine hair, or threads, and these were common in all our tours.

Lagerstrœmia seeds, (we noticed in Nilambur, and other tours) though very profuse, are so small and light that wind will never find it difficult to blow them off.

It is not all fruits and seeds that are provided with wings, and that can be blown by the wind. The *Balanocarpus* seed we saw at Kodimadi, cannot be blown by even the strongest wind beyond a few yards. Still we were not able to see some saplings without a mother tree near by nor was there any sign of parent tree cut in Kariar on the bank of a temporary streamlet, disbursing its tributes to the river Tambraparni. We all concluded last year that the seeds must have been brought down by the water of the streamlet from a very long distance.

Jack and Mango seedlings, coming up in the droppings of elephants and pigs have frequently been noticed. Here, the perianth of the Jack fruit and the pericarp of Mango are sweet and are much liked by the animals. Tho testa of the Jack seed and the endocarp of mango are hard, and pass through the alimentary canal of the animal without sustaining any injury. *Melia dubia* is another example of this nature, we noticed, dropped by the deer in Nilambur.

Of the shrubs special mention may be made of *Lantana* in Coorg which was introduced about 40 or 50 years ago as an ornament in a garden. It has now spread throughout the length and breadth of this little country and covers up about 1/3 of the whole area. The fruit of this is a sweet drupe and voraciously devoured by man, beast and birds and all these have jointly contributed to their spread. *Mimosa pudica* is fast usurping the Coorg soil bordering Malabar where it is abundant. Cattle coming from Malabar have been the chief agent of spread here. It was invariably found, wherever these cattle left their droppings, there appeared some seedlings of this shrub.

Triumfetta, Urena, Achyranthes and numerous others have none of the qualities that would attract an animal We have seen them in all our camps, but Walayar will stand foremost in our memory, whenever we have to think about these fruits, as it is here that these have given us the utmost trouble it is capable of, as they were then ripe and ready for dispersal. The hooks on the fruits of *Triumfeta* and *Urena,* the persistent and spinescent bracts and bracteoles and perianths of *Achyranthus* aid these fruits to attach on the body of the animal, that happens to come in contact with these. Not a day passed in our excursions in Walayar forests without these clinging on to our putties and stockings like a leech, we trying, to remove and throw them away and finding it an endless task and in utter disgust and despair of ever getting rid of them completely come back to our tents and there spend some of our precious time in detaching them from our dress. It will not be much to expect a crop of these to form a dense mass in the Walayar forest rest house compound in course. When we found so difficult to get rid of these fruits it is not a wonder that *Martinia diandra* (we saw growing in Mt. Stuart, Walayar and Komuttiyeri) came all the way to India from America by attaching itself with its hooked seeds to the wool of sheep when the latter was imported.

Not only in Ootacamund and Coonoor but in various other places have we seen various trees like Cupressus, pines &c. planted in the compounds of bungalows and houses and other buildings. These are planted there to improve the artistic beauty of the building with their ornamental appearance and for this sake they have been brought from long distances.

Of shrubs special mention may be made of roses. The real rose in true natural state, so far was seen only at Ootacamund and Coonoor in all our tours. Though devoid of the above qualities, the sweet scent and the beauty of the flowers have conquered every lover of nature in the world and this shrub has invariably found a place in almost all the flower gardens and there stands foremost in all its glory and rightly called by the naturalist 'The King of Flowers'.

B. S. CHENGAPPA,
Senior Student,
Madras Forest College, Coimbatore.

Sport in Ceylon.

An article of this nature may seem rather out of place in a College Magazine, but I am inclined to think that it would interest some of its sportsman readers to know what sport we get in Ceylon. The jungles of Ceylon where game of all kinds from elephant to snipe is plentiful, and the running streams, glades, paddy fields and old tanks are enough to delight the heart of any sportsman

One of the pastimes much in favour of is, night shooting at waterholes for leopard and bear. This sounds unsportsmanlike or rather like poaching, but for various reasons peculiar to the island it is looked upon as legitimate sport, and as one of the ways of destroying these nocturnal animals which are very dangerous. This kind of sport can be indulged in only during the dry season, about the middle of July or so when the moon is full, and one who has been in it even once cannot fail to notice the romantic charm and fascination it carries with it. It was late in July that I once went on one of these expeditions with a planter friend of mine.

No rain had fallen since May and the moon being nearly full, everything pointed to a successful shoot. Having sent our saman ahead, we got on our bicycles and rode to a place called Raugalle, where our saman awaited us, at a half ruined P. W. D. bungalow; about 2 p. m. we started for the waterhole, with our tracker Kandan, and after a tramp of about four miles through rocky scrub jungle, we came to an insolated wild spot, where we found a slimy pool in a low lying rock. This is the waterhole.

We had a look at the surroundings. This is the ideal haunt of the bear and leopard and we found fresh tracks of bear leading to the waterhole, a sure sign of good sport to follow. These animals prefer such pools to quench their thirst after sunset, to rivers and lakes, owing to their timidity and as they feel more at home in the seclusion of the jungle.

It is now nearly 6 o'clock and daylight is on the wane. We settle ourselves in the ambuscade, which is a low breastwork of loose rough pieces of rock, overlooking the waterhole, with our guns loaded and ready. Numerous kinds of brightly plumaged birds appear at this time and animate the scene, twittering and taking a parting drink before retiring to rest, and among them a jungle cock, strutting about in a dignified manner, and now and then giving a shrill crow. The scene changes again, all bird life has vanished, the sun has gone down with a roseate glow and the moon is appearing over the tops of the low lying distant trees. Every thing is still and with our eyes just above the breastwork we peer into the darkness of the bushes before us, eagerly listening for any sound that may indicate the approach of the quarry.

We have not long to wait. A rustle of dry, fallen leaves indicates the approach of something. "Karadi" whispers Kandan, our tracker. It is a bear. It slowly ambles on to the light grunting and sniffing; as it approaches the waterhole the white patch on its chest appears very clear. From my position, I have a better view of the animal, so raising my gun, I aim at the shoulder and fire, a yell follows, then standing upright it falls over and rolls down the rock. After a little struggle it is still and the first bear is killed. We make our way down and pull it clear of the water hole and out of wind and resume our watching.

About half an hour we had settled down, another unexpectedly appears over the rocks to our right. It seems to have got our wind and is about to make off, but my friend fires and drops it, a good shot indeed. We drag it alongside the other and settle ourselves again. It is not yet midnight and the moon is well up and everything is brightly illuminated, and the slightest movement of the air causes the leaves of the surrounding jungle to shimmer like silver. Suddenly in the still we hear a report as of the snapping of the branch of a tree. After a while something large pushes its way on the left. It is an elephant and it remains stationary at the border of the jungle, evidently to see if "all's well" and satisfied, he slowly approaches the waterhole, with its huge form lit up by the moon. It takes a long drink, pours a little over its body, turns quickly round and disappears. How such a huge brute could move about so silently is wonderful. Suddenly, I discovered a leopard lapping the water, come there as if by magic. It shows a good flank, and afraid that it may disappear as quickly as it came, I aim behind the shoulder and fire. It growls, springs into the air and falls flat on its side; stone dead first shot,—great luck. Still we continue to watch and we hear the mellow call of a sambhur coming closer to us. "Madu man" says out tracker. It advances cautiously and stands before the waterhole like a statue in the moonlight, forming with its spread of antlers and stateliness, a perfect picture. It has drunk and is off. Our eyes are heavy and setting the tracker to watch we lie down to sleep. Soon however I am startled by a report and rising I am just in time to see a bear shot by my companion rolling down the rock. We sleep again only to be disturbed by our tracker, informing us that it is daylight.

L. E. J.
Coimbatore.
31—10—19.

The Ceylon Ghat Tracer as a height and distance measurer.

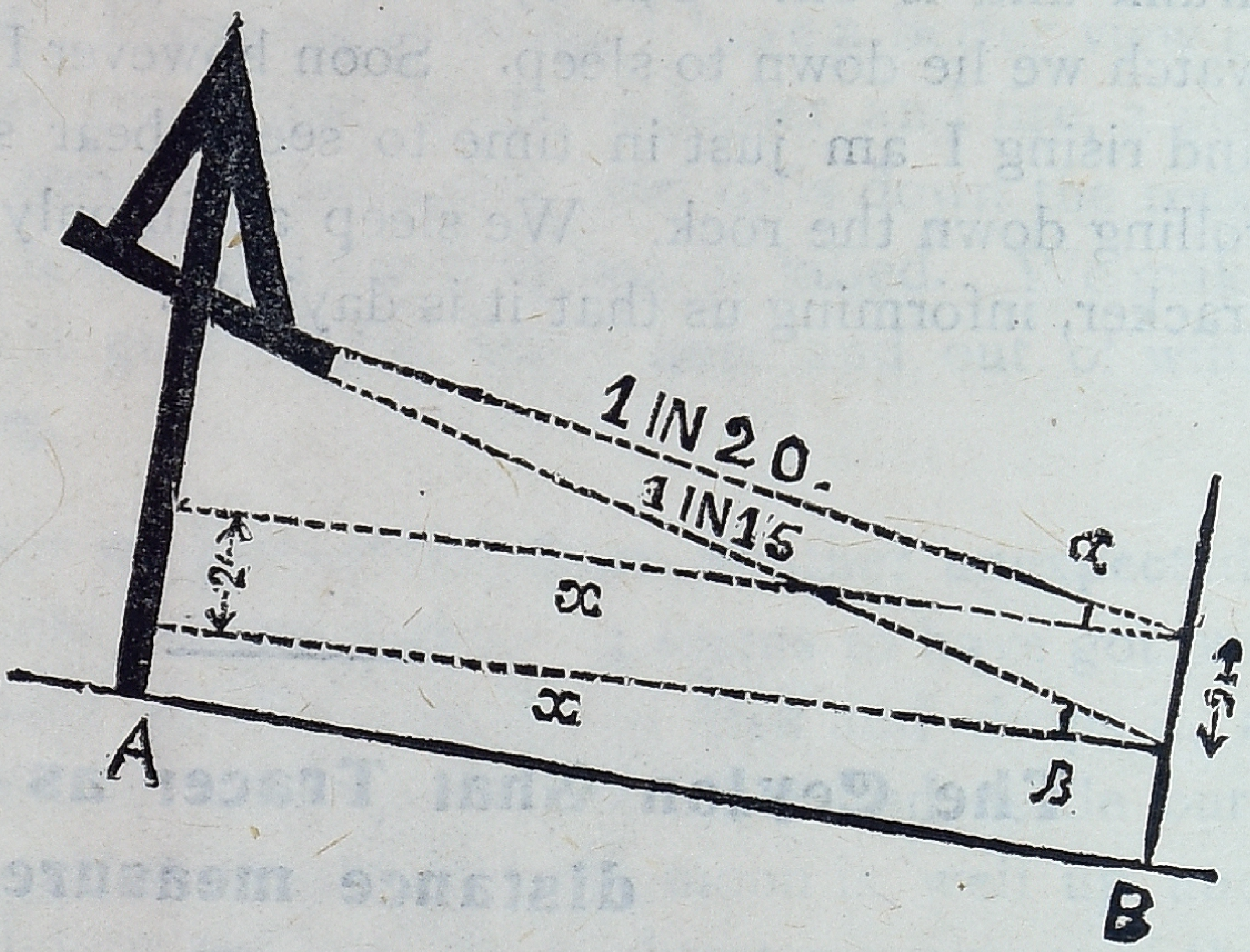
The Ghat tracer hitherto has been used only for levelling purposes, and for obtaining the gradients by direct reading. It can also be adapted for telemetric purposes and for height measurements. The results obtained are not as accurate as those obtained from angular instruments as the theodolite but are sufficiently so for all practical purposes in forest work. Any result however approximate, is of immense value, expecially in preliminary work, and where expedition is of any consideration. Heights and distances may be measured with the ghat tracer correct to within a foot, which is all that can be demanded of an instrument which replaces one with high lens power.

1. To find the distance between two points in tracing a road.

The cross staff usually employed with the ghat tracer requires an extra cross bar fixed to it exactly 2 feet below the existing one. Two readings are also necessary—one to the top bar and one to the bar below it.

With the aid of the following table, distances can be obtained without actual measurement as will be seen from the diagram.

Rule: Divide 200 by the difference between the figures shown against each gradient.



Example: Reading to top vane 1 in 20

" lower " 1 in 15

Distance A—B $= \frac{200}{6.67-5.00} = 119.8$ or 120 ft.

The calculation can be proved trignometrically.

$$\tan \alpha = \frac{x}{20}, \quad \tan \beta = \frac{x}{15}$$

$$\tan \beta - \tan \alpha = \frac{x}{15} - \frac{x}{20} = 2'$$

$$\therefore \quad \frac{20x-15x}{300} = 2'$$

$$\text{or} \quad \frac{5x}{300} = 2'$$

$$\text{or} \quad x = \frac{2 \times 300}{5} = \underline{120} \text{ feet.}$$

The above calculation serves also the purpose of checking the accuracy of the ghat tracer. If the ghat tracer does not give the distance as calculated by this method it is inaccurate.

TABLE :

Gradient.	Tabular figure
Level.	0·00
1 in 120	0·83
1 in 90	1·11
1 in 60	1·66
1 in 50	2·00
1 in 45	2·22
1 in 40	2·50
1 in 35	2·86
1 in 30	3·33
1 in 24	4·17
1 in 20	5·00
1 in 18	5·55
1 in 17	5·88
1 in 16	6·25
1 in 15	6·67
1 in 14	7·14
1 in 13	7·69
1 in 12	8·33
1 in 11	9·09
1 in 10	10·00
1 in 9	11·11
1 in 8	12·50
1 in 7	14·28

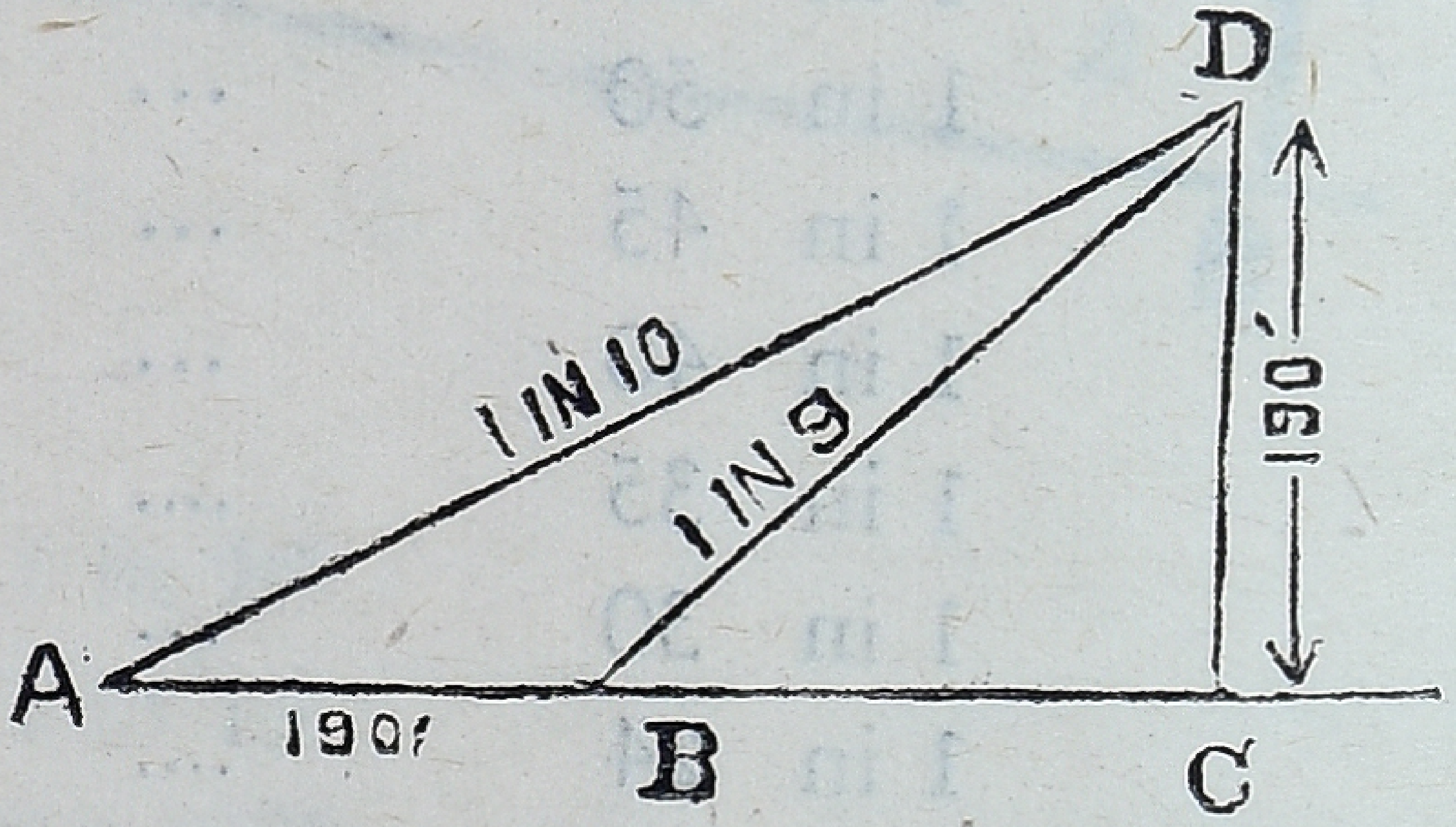
If one of the readings gives a rising gradient, and the other level or, vice versa divide 200 by the rising gradient.

If one of the reading is a rising gradient, and the other a fall-gradient or vice versa divide 200 by the sum of the figures opposite each gradient.

To find the height of a distant object such as a hill peak, saddle or a spur :—

Two readings should be taken from two points in the same straight line with the object.

Measure the distance AB and divide it by the difference between the reciprocals of the gradients.



Example : Gradient at A = 1 in 10
" at B = 1 in 9
Distance A B = 190

$$\text{Height C D} = \frac{190}{10-9} = \underline{190 \text{ ft.}}$$

If the ghat tracer can be graduated to read gradients as steep as 1 in 1, heights of trees may also be obtained.

3. To find the breadth of a river :—

Read the gradient from the water line along one bank to a point in the water line along the opposite bank at right angles to the stream (without the cross staff). Measure the height of instrument or of the cross staff, and multiply it by the gradient for the breadth.

Example:	Gradient to edge of water	...	1 in 40
	Height of instrument	...	5 ft.
	Breadth of river	...	$5 \times 40 = \underline{200 \text{ ft.}}$

R. E. LEMOS,

Forest Ranger, Ambasamudram.

[The article is suggestive as showing that the ghaut tracer in the hands of a clever man, can be put to more uses than merely tracing roads. There are one or two inaccuracies, however, in the article, and it can also be improved in other respects. For instance, it is stated that tan $\alpha = \frac{X}{20}$ where X is the distance required, which is obviously incorrect. Similarly tan β is not $\frac{X}{15}$; but tan $\alpha = \frac{1}{20}$ and $\beta = \frac{1}{15}$ and $\underline{\tan \beta - \tan \alpha = \frac{1}{15} - \frac{1}{20} = \frac{2}{X}}$ $\therefore X = 120$. Besides, the use of the table is cumbersome, and quite unnecessary as it involves dividing 200, by a decimal fraction etc. The result could be obtained more accurately, and more simply in the manner shown above. Vide the calculation underlined. As the ghaut tracer is not provided with any lens, its range for distances is extremely limited. For short distances, it is quite good.—ABDUL KARIM.]

Madras Forest College Athletic Sports.

The Annual Athletic Sports were held on the afternoon of the 18th September. Their Excellencies Lord and Lady Willingdon were present, and there was a record attendance.

The arrangements were excellent; unfortunately a heavy shower of rain at noon had made the track rather heavy, but in spite of this three College records were broken, namely, the High Jump, the 100 yards Race for past students, and the Mile.

J. A. Muliyil one of the best athletes in residence, had been keeping very poor health, and so was unable to do himself justice. He did a very graceful High Jump of 4 ft. 11¼ inches, without much effort, and with absolutely no practice.

In the "Hurdles", Muliyil had very bad luck. He was leading by ten yards at the last Jump, but unfortunately missed his stride, fouled the hurdle, fell, and had not sufficient strength to scramble in fast enough, and was beaten by inches by L. E. Juriansz. The lion's share of the prizes went to M. B. Subbiah and Juriansz. The latter won the "Richmond Cup" with 20 points; while M. B. Subbiah who was just one point behind for the championship, collared most of the plums, such as "The Moopil Nair Cup", the Principal's prize, and the Vice-President's Cup.

The Sack Mêlée and "Log Cutting" were keenly contested events, and afforded good sport to the spectators. Her Excellency Lady Willingdon very kindly presented a prize for the "Log Cutting", which was won quite easily by D. Venkateswarulu.

The last event was the Willingdon Mêlée — a Sack fight between the Forest Department and the World. The World was large and heavy, but happily enough the Forest Department won.

At the conclusion of the Sports the Principal delivered an appropriate and delightfully humorous speech, to which His Excellency replied.

Her Excellency then presented the prizes. The following is a list of the prize winners:—

100 yards Flat Race.

1. L E. Juriansz. 11 2/5 seconds.
2. M. B. Subbiah.
3. J. A Muliyil.

Long Jump.

1. J. A Muliyil. 16 ft. 11 inches.
2. M. B. Subbiah.
3. L. E. Juriansz.

100 yards Race — Past Students.

1. C. S. Nanjappa. 12 seconds.
2. T. D. Ponniah.

High Jump.

1. J. A. Muliyil. 4 ft. 11¼ inches.
2. Abdul Rahim Khan.
3. L. E. Juriansz.

Throwing the Cricket Ball.

1. L. E. Juriansz. 84½ yards.
2. M. P. Subbiah

120 yards Hurdle Race.

1. L. E. Juriansz. 20 seconds.
2. J. A. Muliyil.

Slow Cycle Race.

1. K. Appa Rau.
2. Abdul Rahiman.

440 yards Race.

1. M. B. Subbiah. 60 seconds.
2. L. E. Juriansz.
3. K. Appiah.

Invitation Half Mile Race.

1. Jesudian. L. M. H. School. 2 mins. 28 seconds.
2. Kesavelu. L. M. H. S.

Half Mile Race.

1. M. B. Subbiah. 2 mins. 30 seconds.
2. K. G. Monappa.
3. V. Narayanasamy Ayyar.

Sack scrimmage.

Narayanasamy Ayyar.
Abdul Rahiman.
Theodore.
Karumbayya.
Nageswara Ayyar.

One Mile Race.

1. M. B. Subbiah. 5 mins. 32 seconds.
2. V. Narayanasamy Ayyar.
3. L. E. Juriansz.

Log Cutting.

1. D. Venkateswarulu.
2. M. P. Subbiah.

Willingdon Mêlée.

The Forest Department beat the World.

The inter divisional Hockey Match for the Cowley-Brown Cup.

The game was played on the College grounds on the 9th October 1919. It was a pleasant evening with a light wind which wafted the M. F. C. flag on the newly erected flag staff in the Athletic grounds.

Mr. Longrigg was umpire The match was played with much keenness on either side; the Seniors being very anxious to retain the cup which they had won in the previous year; and Juniors to wrest it from the Seniors.

Individually every player did his best; but there was good combination amongst the Seniors who exhibited cleverness in the manner in which they passed the ball. Among the Juniors there were some good individual players, but the team lacked combination; and the result of which was that they lost by 14 goals to nil.

This is the second time in the annals of the College that the Seniors have retained the cup won by them in the privious year.

The Principal, the donor of the cup, Mrs. Cowley-Brown, Mr. Cornwell etc. were intersted spectators.

After the termination of the game the Principal made a short impressive and instructive speech pointing out the objects with which the cup was presented, and how want of combination would result in a defeat. He observed that the cup was instituted not only for encouraging the game but also to create amongst the students a feeling of brotherhood and determination.

G. Appa Rao,
Secretary
Athletic Club, M. F .C.

Results of matches played by the Madras Forest College during August, September and October 1919.

HOCKEY.

Date.	Versus.	Result.	Goals.	
			For	Against
14th August.	London Mission High School ...	Won.	10	1
19th August.	Agricultural College ...	Won.	3	1
26th August.	Agricultural College ...	Lost.	3	1
2nd Sept.	Central Recruits School.	Won.	12	Nil.
9th Sept.	Reserve Police ...	Interrupted by rain; three to one in our favour.		
23rd Sept.	Reserve Police ...	Play interrupted by rain.		
30th Sept.	Reserve Police ...	Draw four all.		
7th October.	Young Men's United ...	Won.	4	2
14th October.	Young Men's United ...	Won.	5	2

Coimbatore Hockey Tournament.

27th October.	Stanes High School ...	Won.	3	1
28th October.	Reserve Police ...	Won.	4	1
29th October.	Agricultural College ...	Won.	3	Nil.
		Total...	47	9

CRICKET.

Date.	Versus.	Result.
31st Aug. 19.	Agricultural College.	Lost 5 runs.
5th Oct. 19.	Coimbatore United Club.	Lost 30 to 99 runs.
12th Oct. 19.	Coimbatore United Club.	Won by 132 to 116 runs.

G. Appa Rao,
Secretary,
Athletic Club, M. F. C.

Occasional Notes.

The Stanes Hockey Tournament owes its foundation to the generosity of Mr. Robert Stanes, who in 1915 presented a silver

Challenge Cup to be competed for annually by recognised Clubs and Colleges in Coimbatore. On October 29th it was won for the first time by the Madras Forest College. Last year we were in the Finals and probably had the best team in the competitions, but owing to lack of leadership, and to several casualties in the final game, our combination deteriorated, and contrary to public expectation we succumbed to the Reserve Police team. This year we have had the great advantage of Mr. Cornwell's skilled coaching and expert play, while the front line was further strengthened by Mr. Longrigg's dash, and scoring ability. We perhaps had just as good a team individually last year — but the stiffening and controlling element was lacking.

K. Appayya our captain this year has shown himself to be thoroughly reliable in defence, and has been ably supported by M. P. Subbayya, Monappa, M. B. Subbayya, and Havildar Kadir Batcha. K. Appayya is to be congratulated on his successful season fittingly terminated by his victory in the Stanes Tournament, for which eight teams entered. In the first ties the College defeated Stanes High School, in the semifinals the Reserve Police, and in the Finals the Agricultural College. The Agricultural College had the misfortune to be without the services of their coach and leader Dr. Norris. As regards Casualties from the play, the luck was about the same on both sides. It the Finals, the Forest College played rather below its form. The games played in a clean and healthy spirit, were to the on-lookers an edifying example—may this same atmosphere prove infectious in Coimbatore.

The Central Police Recruits School has furnished excellent grounds, and the referees were observant, prompt and firm.

If the present conditions, and spirit continue, the prosperity of Coimbatore Hockey in general and of the Madras Forest College in particular is assured.

* * *

On the recommendation of the Vice-President, Athletic Club Hockey Colours have been awarded to student Juriansz.

* * *

G. Appa Rao has been selected as Secretary of the Athletic Club.

* * *

The following colours for Athletics have been awarded :—

L. E. Juriansz	20 marks.
M. B. Subbiah	19 ,,
J. A. Muliyil.	13 ,,

* * *

Under Appendix I Athletic Club Rules, upon the report of the Vice-President, Athletic Club, student Juriansz is awarded his colours for Athletics.

* * *

The Principal accepts with many thanks the generous offer of Senior Student S. Nagalingam Pillai to present his War Bond for Rs. 100 to the Students' Club Fund. Student Nagalingam Pillai will be shown on the Tablets of the Club as a Patron.

* * *

Ranger Mr. Nicholas (1912—14) has generously contributed Rs. 100 towards the Students' Club. He thereby becomes a Patron.

* * *

Mr. T. D. Ponniah (1917—19) has generously contributed Rs. 100 in War Bond to the Students' Club.

* * *

A yale triplex differential hoist, and a bamboo fire station have been added to the Engineering park apparatus.

* * *

The first examination of the Students' gardens was held on the 31st October. Considering the short time that the gardens have been started (about 10 weeks), the unfavourable weather, and the many calls on Students' leisure during the first Head Quarter term of the year, the display in most cases was very creditable.

Students are recommended to confine their efforts chiefly to edgings, Cannas, quick growing trees, such as Terminalia Catappa and ornamental crotons, as the special conditions of students' gardening are unfavourable to the cultivation of flowers. The designs were in many cases ingenious and successful. Student Abyankar is to be commended for his maze and puzzles, student M. B. Subbayya for his clock, and student Monappa for his Union Jack.

On the trellis of the Hostels perennial and not annual creepers should be cultivated.

The highest marks for creepers were awarded to Block IV, and for individual gardens to students K. G. Monappa, and M. B. Subbayya.

During the touring terms the gardens will be maintained as far as possible in their present condition.

The next examination will be held at the beginning of April.

* * *

A village council for the servants' colony has been established.

A Night School is in process of formation.

* * *

At the November Examination of the Servants' gardens the following were the awards:—

1st Prize.	Forest guard. (Kistnan).
2nd Prize.	Mali Ramaswami.
3rd Prize.	Abdul.
4th Prize.	Mali Arumugam.

Highly commended. Havildar Kadir Batcha.

Sweepers' gardens:—

1st Prize.	Raman.

* * *

Head Mali Arjunan was given a pecuniary reward for detecting by means of an ambush a culprit in the act of stealing wire, and standards from the College boundary. The accused was sentenced to to 6 months' rigorous imprisonment.

* * *

We understand that Mr. Swamikutti (1914—16. Madras Ranger Higher) has set an excellent example in Malabar District by organising and carrying out the sale of food grain to the indigent inhabitants of Nilambur &c., at greatly reduced prices.

The effort is all the more creditable to Mr. Swamikutti, as he is in charge of one of the heaviest Ranges in India.

* * *

A limited quantity of the new Blazer Flannel is available at the College at Rs. 6—7—0 per yard 54″ wide.

Two yards or less should suffice for a Blazer.

Old students requiring flannel for Blazers may apply to the Principal.

Messrs. Hussain Khan, Tailors, South Parade, Bangalore will put the ordinary monogram on the pocket for Rs. 1-8-0,—Rs. 1-12-0, and "colours" monogram for Rs. 6—4—0 (12 annas per letter being charged in addition).

* * *

The receipt of 4 teak seedlings and some ferns sent by Mr. Nicholas Range Officer Thunakadavu is acknowledged with thanks.

* * *

We have to record with deep regret the death of Senior student A. Srinivasachari from Pneumonia at noon on the 8th September. We offer our sympathy to the bereaved relatives.

He was admitted on 10-8-1919 to the Government Hospital Coimbatore as an Influenza patient. For the last 10 days, he had been practically convalescent. The Principal, House Tutor and some of the students frequently went to see him in Hospital. His temperature on the morning of the 8th was normal, and he had been reading that morning. It was expected that he would return to the College within a day or two. The Medical Officer was of opinion that Secondary Pneumonia intervened suddenly; he also suspected Tuberculosis. The student died quite suddenly.

The funeral was largely attended by members of the College.

This student was intellectually far above the average.

* * *

The College is indebted for the receipt of :—

2 young quails.
4 big partridges
5 young partridges,
& 4 peacocks.
from M. R. Ry. B. S. Ramaswami Ayyar,
R. O. Bhavani.

24 Teak seedlings from M. R. Ry. E. V. Padmanaba Pillai avl. D. F. O. Central Coimbatore;

4 Teak seedlings, and ferns from Mr. A. Nicholas, R. O. Mt. Stuart; about 1000 plants of *Euphorbia heterophylla*, from the Agricultural College garden, Coimbatore; and seeds from many D.F.O.'s.

* * *

Students' Club Fund.

STATEMENT SHOWING AMOUNT STILL DUE FROM PAST STUDENTS.

NAME OF DONOR.	AMOUNT STILL DUE.		
	RS.	AS.	PS.
Mr. C. S. Ramanathan	10	14	0
„ M. R. Doraiswami	3	0	0
„ P. A. Krishnaswami Mudaliar	5	0	0
„ Kerala Varma	10	0	0
„ S. Ramachandra Ayyar	5	0	0
„ S. Chinna Dorai	80	0	0
„ C. M. Kunhiraman Nair	5	0	0
„ Gulam Dastagiri	9	0	0
„ D. E. Lewin	9	0	0
„ S. A. Dawson	11	0	0
„ K. Thiruvenkata Achari	13	0	0
„ C. Karunakara Menon	9	0	0
„ N. T. Thambi	9	0	0
„ P. Karunakara Menon	9	0	0
„ T. Paramasivam Pillai	9	0	0
„ P. Dhananjaya Rao	13	0	0
„ Kesava Pillai	12	0	0
„ I. Ramalingam	8	0	0
„ Rama Rao Kini	8	0	0
„ L. A. Krishna Iyer	7	0	0
„ P. M. Mathew	5	0	0
„ K. S. Raghavachari	3	0	0
„ Kunhi Royan Sahib	7	8	0
„ S. Krishna Ayyangar	15	0	0

Name of Donor.	Amount still due.		
	Rs	as.	ps.
„ Syed Manavar	15	0	0
„ T. K. Parameswaram Pillai	15	0	0
„ P. Krishnan	10	0	0
„ T. E. Varadachari	15	0	0
„ K. Ramachandra Iyer	10	0	0
„ K. G. Sundararaja Rao	10	0	0
„ K. G. Sreenivasa Rao	10	0	0
„ M. Krishna Iyer	10	0	0
„ C. T. Thiruvenkadam	10	0	0
„ S. V. Sibghatullahi	10	0	0
„ Gulam Russool	10	0	0
„ T. R. Naganathan	10	0	0
„ T. S. Narayanaswami Chetty	10	0	0
„ W. Balakrishna Mudaliar	10	0	0
„ Aiyappa Asari	15	0	0
„ D. Patel	18	0	0
„ K. Jayaramam	12	0	0
„ Narasinga Rao	10	0	0
„ A. Subramania Ayyar	10	0	0
„ T. Balaramaswami	10	0	0
„ V. Mahadeva Ayyar	16	0	0
„ P. V. Ramana Rao	12	0	0
„ R. E. Lemos	50	0	0
„ V. Raman Pillai	10	0	0
„ B. V. Nagaraja Iyer	10	0	0
„ Thammayya	5	0	0
„ P. Miranda	5	0	0
„ T. T. Ansep	10	0	0

The following further contributions have been made to the Students' club :—

	Rs.	AS.	PS.
Mr. J. S. Rowland, M. R. Hons (1916—18 Dn.)	45	0	0
„ A. B. Fenn M. R. H.	10	0	0
„ A. Swamikutty M. R. H. ...	45	0	0

Miscellanea.

Fighting forest fires from the skies.

We extract the following from the Scientific American for August 2, 1919 :—

"The chance to furnish invaluable military training for aviators and at the same time to perform a useful peacetime service is now offered in our great Western timber preserves. The annual loss by fire in our forests is enormous, despite the precautions taken to discover the fires as soon as they start and put them out before they can get under head-way. There are patrols on foot and on horse-back, and also on motor-cycles which are constantly travelling over the forest lands ready to put out a blaze when it appears. Lookouts are stationed at high points to watch for smoke, but the vision of those lookouts is necessarily limited. The regions are vast and hence it is impossible to cover them thoroughly, so that fires frequently get a head start and reach serious proportions before the fire fighters can reach them.

In order to enlarge the field of observation balloons are now being used for lookout posts and these rising high above the forests given an excellent view of surroundings for scores of miles in all directions. They are in telephonic communication with fire stations so that they can report a fire at once and send the fire fighters to the scene.

But the balloons do not provide complete protection and so observation airplanes are now being used. These travel at a considerable elevation and can circle over a very wide area. They can travel as far in an hour as a patrol could travel in three or four days. When a fire is discovered the fact is signalled to the nearest station. In some cases a message is dropped by parachute. The latest development is to equip the machines with wireless outfits so that they can telegraph their discoveries immediately. The airplane forest scouts keep in excellent practice and should prove useful in time of war.

Time is the most important element in this work and even though airplanes are speedy and can make their report instantly by wireless to the nearest stations it takes time for the men to reach the scene of the fire. What is needed is some first aid treatment to check the fire until the real fire fighting forces can arrive. It has been proposed, therefore, that bombing planes be used, fitted with bombs containing gases that smother fire. The fires then can be fought just as the Huns were fought by means of gas attacks. Carbon-di-oxide or some other gas dropped on the fire will smother it, and if the blaze is discovered in its early stages a few bombs may quench it completely. At any rate a fight can be started on the fire as soon as it is discovered, instead of waiting a long time for the fire fighters on the ground to reach the spot."

* * *

Fixing of green colour in plants.

The method of fixing the green colour in plants described in the "Kew Bulletin" so long ago as 1908 deserves to be more widely known than it seems to be among those interested in preparing plant specimens for exhibition in museums, or for lecture purposes. By placing the plant for a shorter or longer period in a boiling solution of Copper acetate dissolved in acetic acid, a combination of the copper salt with the chlorophyll is formed which serves to render the colour permanent when the specimen is exposed to the light after drying, or placed in a perservative solution such as alcohol. Different plants lend themselves to the treatment with different degrees of success, and require very different periods of treatment; the time for which it is necessary to keep the plant in the boiling solution varies from 1 minute to 40 minutes, according to the action of the copper salt on the plant. If the action is proceeding satisfactorily a period of 1 to 5 minutes will suffice; the end of the operation is easily judged by the colour, or by treating two different specimens for different periods; a specimen that by such comparison appears to require longer treatment can always be re-immersed to get the desired effect.

Many plants, notably the leaves of evergreen shrubs are more difficult, and generally less satisfactory in the ultimate colour, probably owing to the presence of mucilaginous, or, decomposing, products, or tannins. These require long treatment varying from 20—40 minutes; after the first immersion they turn yellowish, and then, after some time the yellow gradually gives place to green, generally an olive green.

After treatment the plants should be washed (like photographic prints) in running water for about two hours. They are then dried under as light pressure as is compatible with keeping the plants from twisting, or, after shaking off as much water as possible, may be dried in hot sand. In many cases the plants are rendered so flaccid by boiling, that sand drying is difficult or impossible.

Young parts of plants green better than old; better results may be expected from spring leaves than from autumn leaves.

A stock solution is made by saturating commercial strong acetic acid with powdered copper acetate. For treatment dilute the stock solution with water in the proportion of 3 or 4 parts of water to one of stock solution. The solution is heated in a non-metallic vessel, glass beakers being probably the most suitable, and wooden non-metal forceps should be used for manipulating the specimens. Extract from "Scientific American"

* * *

The daily water consumption in New York is 600,000,000 gallons: (Scientific American): the Madras Forest College requires 14,000 gallons per day for its full development; it actually gets from the D. P. W. cistern at present about 4,800 gallons per day.

* * *

Oxygen requirements of roots.

Messrs. **B. E. Livingstone** and **E. E** Free have reported a number of observations indicating that the æration of the soil is a much more important factor in plant ecology than has hitherto been suspected. They have found, for example, that Heliotrope and *Coleus* require the maintenance of a certain oxygen-content in the air of the soil about their roots in order to thrive. The roots of Oleander, on the other hand, appear to require much less oxygen than the plants above named, and the injury produced by entire deprivation of oxygen is much less quickly developed. The roots of swamp willow appear to be unaffected by a lack of oxygen; they grew normally for periods as long as ten weeks with no oxygen in the soil.

(SCIENTIFIC AMERICAN.)
April 14th 1917.

* * *

Extract from a letter from a Coorg old student to an Instructor.

"I was one of those pessimists who while at the College always thought that most or at least some of the things in Engineering taught at the College are useless, or at least can never be made use of in our practical life. I am very sorry I made a great mistake.

Every word you uttered in the lecture rooms is found useful to me now.

I laid out the profile of the tram road culverts, and dry earth slides and a 200′ radius curve all strict in accordance with instructions I received at the College and this was not passed without being recognised by the Engineer Mr. R. D. Smither under whom I am working.

* * *

The following evidence by Mr. P. M Lushington before the Industrial Commission is of interest :--

Q. How is it that Government embarked on Malabar teak plantations? Was there a properly constituted Forest Department for teak plantations?

A. No. It was a matter of chance. The way it was started was this. There was a needy temple which was very much in debt and they wanted to do something to help it so as to keep it out of debt and the only course was to take these forests on lease and give a certain amount of money down. When the land was handed over, a shrewd Collecter started the teak plantation which was subsequently handed over to the Forest Department.

Q. Considering the expenditure that was incurred on the development of that plantation, has it turned out so far to be a commercial proposition?

A. Magnificiently.

* * *

Extract from the Planters' Chronicle dated 20th September 1919.

"The following easy calculation for finding the approximate amount of water in a well or water hole may be useful to some of your planter readers of your valuable journal :—

1. Measure the diameter of the well at the top.
2. Square it, and knock off the last figure.
3. Divide the result by 3.
4. The result will be the number of gallons per foot of water in the well.
5. Find the depth of the water by means of a stick.
6. Multiply the last result and you will have the number of gallons of water in the well.

Example:—

1. Say, diameter of well. 5 ft. or 60 inches.

2. 60 × 60.	3600.
3 & 4. 360 ÷ 3.	120 gallons per foot of water.
5. Depth of water.	10 ft.
6. 120 × 10.	1200 gallons of water."

* * *

Potash from Banana stalks and skins: One of the many plants recently suggested as a source of potash is the banana. A ton of stalks yields 188 pounds of dry matter, containing 13·7 % of potash. An examination of banana skins showed a total potash content of 1·05 % the dry matter containing 9·05 % potash.

"Scientific American"
June 9th 1917.

* * *

Duration of leaves in Evergreens: Leaf duration varies widely both among different species and among individuals of the same species. The shortest duration is found in *Rhamnus purshiana* – a quasi-deciduous plant. The longest duration is noted in *Taxus brevifolia* in which some leaves have persisted for *23 years* through the average is from 5 to 12 years. Saplings of evergreen trees have a shorter leaf duration than mature trees in the same habitat. Trees and shrubs growing in the open have a shorter leaf duration than those of similar age in the shade.

Scientific American.
April 28th 1917.

* * *

Among the plants found most sensitive to soil acidity are Asparagus, barley, beets, celery, leek, lettuce, onions, clover, spinach, and tobacco.

Paper from spinach. A French horticulturist proposes the stems of Spinach for making paper. (These contain 46% of cellulose against 6% in the stems of wheat straw) According to him, the quality of the paper produced is as good as the best Japanese one.

"SCIENTIFIC AMERICAN."

* * *

List of books received for the General Library for the Quarter ending 30th September 1919.

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1. Working Plan for the Naini Tal Forest Dn. Kumaon Circle United Provinces.
2. Eminent Victorians.
3. Fourth Dimension simply explained; By Manning.
4. Report on Forest Management in Germany, Austria and Great Britain; By C. Campbell Walker.
5. Supplement to reports on Forest Management in France, Switzerland & Lower Austria; by Lt. C. G. Pearson.
6. Notes on Forestry; by C. F. Amery. 1875.
7. Mensuration of timber & timber Crops; by P. J. Carter.
8. Report on the working of Casuarina Plantations in the Nellore Dist. since 1899–1900; by E. R. Murray.
9. Report on the measurement of rates of growth of Casuarina in the Nellore District.
10. Circulars of the Consr. of Forests Central Circle 1898 to 1908.
11. Code of criminal procedure 1882 (Act No. X of 1882).
12. Ready reckoner; by M. C. Guha.
13. Malaria In the Punjab; by Lt. Cl. G. F. N. Braide I. M. S.
14. Administration report of Madras Presidency 1877—78.

15. Extract from the Forest Code relating to the maintenance of Depôt accounts.
16. Appendix 1. Working Plan of the Sholakarai Block; by Campbell Walker, Lt. Col.
17. General Catalogue of exhibits forwarded to Culcutta for the London Exhibition.
18. General Catalogue of exhibits forwarded for the International Forestry Exhibition, Edinburgh.
19. The Date Palm in India; by E. Bouania, M. D.
20. Forests; A pamphlet by Lt Cl. G. J. Von Someron.
21. A supplement of Drury's useful plants of India 1884.
22. Dr. Bouania's Date Palm in India. (Tamil Book).
23. Text book of the diseases of trees; by Professor R. Hartig.
24. Timbers, and How to know them.
25. Forest Law; by Baden Powell.
26. Lectures on the Physiology of plants; by Julius Von Sachs.
27. Elementary lessons in Physical Geography; by Sir. Archibald Geikie.
28. Spineless Cactus.
29. Forestry in South India; by Morgan.
30. Analytical key to the Animal Kingdom; by B. B. Oosmaston F. C. H.
31. Origin of Species; by C. Darwin.
32. Fancy waterfowl; by; Frank Finn.
33. How to know Indian Ducks; by Frank Finn.
34. How to know Indian waders; by Frank Finn.
35. The birds of Calcutta; by Frank Finn.
36. The practice of Forestry; by C. J. Michie.
37. Botany; The modern study of Plants; by Marie Stopes.
38. Flowers, Fruits and leaves; by Sir John Lubbock.
39. Gardening; A Guide for Amateurs in India; W. W. Johnstone.

40. Suggestions for future Forest Colleges; by F. L. C. Cowley-Brown Esqr.
41. Govt. Security Manual; 1919.
42. Indian Munition Board Hand book.
43. Manual of Standing orders for Forest Subordinates, Rangoon, 1919.
44. Addenda, and Corrigenda. Slip No. 14. Supplement for the Gorakhpnr Working Plan, Eastern Circle, Uuited Provinces
45. Indian Forest Records; Vol. 7, part 2, by F. A. Wright.
46. Report of the woods and Forest Department for the ½ year ending 30—6—19, for Western Australia.
47. Note on a tour of inspection in some of the Forests of the Madras Presidency; by G. S. Hart C. I. E.
48. Notes on Forest Policy; by F. A. Lodge Esqr. C. I. E.
49. Working Plan for the Mount Stuart Forests; S. Coimbatore Dn.; by H. F. A. Wood.
50. Commercial Forestry in Britain; by E. P. Stebbing.
51. British Forestry; by E. P. Stebbing.
52. Cleghorn's "Forests and gardens of South India" 1861.
53. The Times History of the War; presented by Mrs. Cowley-Brown.

Contributions to the Gass Museum.

Serial No.	Contribution.	Contributor.
1	Two models of elephants.	Mr. A. Swamikutty M. R. H. R. O. Nilambur.
2	A Queen ant.	M. P. Phillip M. F. C. Student 1919-21 Division

Serial No.	Contribution.	Contributor.
3	A framed photograph of Halley's Comet.	M. R. Ry. C. P. Garudachala Mudaliar, R. O. Pollachi.
4	Loan of :- (a) Two mounted panther skins. (b) Two unmounted panther skins. (c) One Mounted tiger skin.	The Hon'ble Mr H. G Stokes, C. I. E., I. C. S.
5	8 oz. of Sandal oil.	M. R. Ry. A. R Narasimha Ayyangar Avl. D. F. O. N. Mangalore.
6	One specimen of Vegetable pathology.	H. A. Latham Esq.
7	26 Bark samples.	M. R. Ry. E. K. Krishnan Avl. D. F. O. N. Vellore.
8	66 Photographs.	Imperial Forest College Dehra Dun.
9	Three photographs.	S. Nagalingam Pillai Student M. F. C. 1918—20, Dn.
10	Larva of a Bostrochid.	M. R. Ry. G. N. Subba Rao B.A. R. O. Attur Range.
11	Sample of Satin spar.	R. B. Cornwell Esq. E. A. C.
12	Two long panels Two short " Four blocks } ...	M. R. Ry. B. S. Ramasami Ayyar R. O. Bhavani.

Advertisements.

The following numbers of the 'Indian Forester' are required for the *Students'* Library, The Principal will be glad to receive any that officers can spare:—

1. Volume 1, 2 and 3 for 1875—76, 1876—77, and 1877—78.
2. Volume 6 for 1880—81.
3. Volume 13 for 1887—February Number.
4. Volume 14 for 1888—January, February, March, April and December numbers.
5. Volume 15, 16, for 1889, and 1890.
6. Volume 17 for 1891—August, September, October and November numbers.
7. Volume 18 for 1892.
8. Volume 19 for 1893—February number.
9. Volume 20 for 1894—January, February, March, July and August numbers.
10. Volume 21 for 1895.
11. Volume 24 for 1898—March and April numbers.
12. Volume 25 for 1899—April, May, June and August to December number.
13. Volume 26 for 1900—August number.
14. Volume 34 for the year 1908—July number.
15. Volume 36 for the year 1910—August number.
16. Volume 38 for the year 1912—January, March, October and December Nos.
17. Volume 39 for the year 1913—January, April, September and October Nos.
18. Volume 40 for the year 1914—June number.

19. Volume 41 for the year 1915—April and September numbers.

20. Volume 42 for the year 1916—May, June, November and December numbers.

21. Volume 43 for the year 1917—January, February, April, November and December numbers.

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Madras Forest College, Coimbatore. } F. L. C. COWLEY-BROWN, *Principal.*

Gazette Notifications.

2ND SEPTEMBER 1919.

M. R. Ry. S. Srinivasa Rao in charge of Attapadi range, Central Coimbatore, is dismissed from Government Service, and all pay and allowances now due to him are forfeited to Government.

M. R. Ry. A. P. Srinivasa Ayyangar granted privilege for 3 months from 29th June 1919, is recalled to duty, and posted to Mangalore range, N. Mangalore division—to join at once.

M. R. Ry M. N. Raman pillai, Mangalore range, is on relief, transferred to Attapadi Range, C. Coimbatore division.

9TH SEPTEMBER 1919.

Mr. F. X. Mascarenhas, Special Veterinary Inspector of the Forest Department, privilege leave for 1 month and 27 days. M. R. Ry. S. V. Devadoss Pillai special Veterinary Assistant Inspector of the Forest Department to act as special Veterinary Inspector, during the absence of Mr. F. X. Mascarenhas. The two months' privilege leave granted to R. O. M. R. Ry. S. Chidambara Ayyar is extended by one month

16TH SEPTEMBER 1919.

Mr. C. C. Wilson, Dy. Conservator, Combined privilege leave and furlough for 7 months from date of relief.

Mr. A. A. F. Minchin, D. F. O Ganjam, privilege leave for 1 month. M. R. Ry. V. Narayana Ayyar Avergal, E. A. C. *Sub-pro-tem* will act as D. F. O. Ganjam.

M. R. Ry. C. Ramaswami Naidu, R. O. II grade. privilege leave for 2 months from date of relief.

B. T. Sitarama Ayyar, Dy. Ranger I grade to be Ranger VI grade, *Sub-pro-tem.*

K. Parthasarathy Ayyangar Dy. Ranger II grade to act as Ranger VI grade *Vice* M. R. Ry. C. Rajagopaul Naidu, on leave.

The following postings and transfers are ordered :—

(1). M. R. Ry. K. Kunhiroyan Sahib, R. O. to charge of Mettupalayam Range, Central Coimbatore.

(2). M. R. Ry. N. Gopalan Nayar, Dy. Ranger II grade, and Ag. R. O. VI grade, to charge of Begur Range, North Malabar.

(3). M. R. Ry. C. Vasu, R. O. VI grade to charge of Timber duty Nilambur.

M. R. Ry. C. M. Narayanan, R. O. III grade, Kollegal, privilege leave for 3 months.

P. Sankuni Menon, Dy. Ranger I grade and Ag. Ranger VI grade is transfered to Central Coimbatore, for special duty in Chenat Nair R. F. to join on relief.

23RD SEPTEMBER 1919.

M. R. Ry. P. Govinda Menon Avergal, Pro. E. A. C. privilege leave for Six weeks with effect from 12—8—19.

Promotions and Confirmations :—

1. Y. Pedda Lakshmayya Naidu, Dy. ranger, II Grade to act as Ranger VI Grade, *sub-pro-tem*.
2. M. Umapathi Mudaliar, Dy. ranger II Gr. to act as ranger VI Grade, *sub-pro-tem*.
3. A. K. Joseph, Dy. ranger, II Grade to act as ranger VI Grade.
4. M. Subba Rao, Dy. ranger II Grade to act as ranger VI Grade.
5. Behara Bhagirathi, Dy. ranger II Grade to act as ranger VI Grade.
6. Y. Venkataswami Naidu, Dy. ranger II Grade to act as ranger VI Grade.

Promotions No. 1-3 will take effect from date of taking charge of the ranges to which they are posted on return from Madras Forest College.

30TH SEPTEMBER 1919.

M. R. Ry. M. Subroil Naidu, R. O. III Grade is transferred to the charge of Adoni range.

M. R. Ry. J. M. Abraham, R. O. IV Grade, is posted to the charge of Vempalli range.

M. R. Ry. Ramuni Menon, R. O. II Grade Ganjam Dt. privilege leave for 3 months.

M. R. Ry. N. Swaminatha Iyer, R.O. II Grade privilege leave for 2 months from date of relief.

M. R. Ry. K. S. Ramayya, R.O. V Grade is posted to North Coimbatore on return from leave.

This Cancels his posting to Begur Range, North Malabar.

7TH OCTOBER 1919.

M. R. Ry. K. M. Gopala Achari, R. O. in charge of Sriperumbudur range, Chingleput district, is granted sick leave on half pay, for six months, with effect from date of relief.

Mr. Henry MacBride, R. O. on leave is posted to the charge of Sriperumbudur range.

M. R. Ry. A. Manicka Mudaliar, from Kurnool West to Godaveri Upper, for the charge of Lakkavaram range.

Mr. S. A. Dawson, from Godaveri Upper to Kurnool West, for Sivapuram range.

14TH OCTOBER 1919.

The unexpired portion of 25 days' privilege leave granted to H. Mac. Bride, R. O. V grade is cancelled.

Mr. K. P. Benjamin, R O. III grade is granted privilege leave for 3 months from 15th December 1919.

21ST OCTOBER 1919.

Mr. A. A. F. Minchin, D. F. O., Ganjam, privilege leave for 5 weeks from or after 5th October.

M. R. Ry. V. Narayana Ayyar Avl., E. A. C. to act as D. F. O. Ganjam, during the absence of Mr. Minchin on leave or until further orders.

Mr. W. C. Hart, E. A. C. on return from Military duty, to be D. F. O. Tinnevlly, *cum* Ramnad.

M. R. Ry. K. R Krishnan Nair, R. O. IV grade, on return from leave, is posted to S. Coimbatore Division, on special duty.

28TH OCTOBER 1919.

Mr. T. Clear, Dy. Consr. of Forests, Combined privilege leave, and furlough, on medical certificate, for one year, with effect from the date on which he handed over charge of his duties as D. F. O. Tinnevelly.

The Right Honourable the Secretary of State for India has granted to Mr. J. S Scot Dy. Consr., an extension of leave on medical certificate for three months from 1st November 1919

4TH NOVEMBER 1919.

Mr. F. A. Seager, E. D. C., extension of privilege leave for one month.

Mr. E. M. Crothers, E. D. C., *sub-protem*, extension of privilege leave for two months.

M. R. Ry. E. B. Ramachandra Rao avl. is confirmed as Extra Assistant Conservator.

The privilege leave granted to M. R. Ry. S. Chidambara Ayyar, R. O. S. Cuddapah district, is extended by one month.

M. R. Ry. N. Chakrapani Ayyangar, R. O. VII grade attached to Kurnool South, is transferred to Vizagapatam.

M. R. Ry. C. G. Ganapathi, on leave, is transferred to Kurnool South, for Giddalore range, *vice* Ranger, A. Subramania Ayyar, temporarily reduced.

11TH NOVEMBER 1919.

Mr. T. A. Whitehead, D. F. O. W. Kurnool, to be in charge of S. Kurnool division in addition to his own duties, vice Mr. G. W. Thompson permitted to retire from service.

Mr. V. N. Seshagiri Rao, probationary E. A. C. attached to the Nellore district is transferred temporarily to Chittoor to assist the D. F. O. who is ill.

Mr. S. Shanmuga Kumaran Pillai, Ranger, III grade, from Madura to N. Vellore for the charge of Gudiyattam range.

The combined leave for one year, eight months and 13 days granted to Mr. K. B. Krishnan Nair, Ranger IV grade is further extended by 25 days.

18TH NOVEMBER 1919.

M. R. Ry. T. V. Venkateswara Ayyar Avl., probationery E. A. C., privilege leave for one month, and eight days, and leave on Medical certificate for thirteen days, in continuation thereof with effect from 11th June 1919.

M. R. Ry. K. M. Gopalachari, Ranger IV grade *sub-protem* on return from leave is posted to Guntur district to work under the orders of the D. F. O. Guntur.

M. R. Ry. K. S. Ramiah, Ranger V grade, granted leave on Medical Certificate for one month and 17 days from 4th October 1919.

M. R. Ry. K. R. Krishnan Nayar Ranger IV grade is posted for Special duty under the Forest Research Officer, Coimbatore.

The following Foresters are promoted to act as Rangers, VII grade (on Rs. 60) *sub-protem* with effect from 1st October 1919.

1	N. Gopalan Nayar,	Forester,	II	grade.
2.	C. S. Jesudasan,	,,	I	,,
3.	K. Chaikku,	,,	I	,,
4.	R. Srinivasa Rao,	,,	I	,,

25TH NOVEMBER 1919.

M. R. Ry. S. Shanmugakumaran Pillai is posted to the Salem West range, North Salem division.

M. R. Ry. T. D. Rajabadar Mudaliyar, Ranger VII grade, is posted to the charge of Thammampatti range, S. Salem division.

M. R Ry. G. Devanayagam Naidu, Ranger VI grade is transferred from W. Vellore, and posted to N. Vellore Division for the charge of Gudiyatham range.

M. R. Ry. S. Doraisamier, Ranger V grade, in charge of Anchetti range, N. Salem Dt., is granted privilege leave for 3 weeks from date of relief.

M. R. Ry. C. D. Parthasarathy Chetty, Ranger V grade, Gudiyatham range, granted Privilege leave for one month, and twelve days from date of relief.

* * *

Balance sheet of accounts of the Madras Forest College Magazine 1918 - 19.

Receipts.

Items	Particulars.	Amount Rs.	As.	Ps.
1	Annual subscription for 1918—1919 from 203 old members @ Re. 1 each ...	203	0	0
2	Entrance donation from .—			
	The Secretary to the Board of Revenue, Madras... ...	10	0	0
	2 Provincial Officers @ Rs. 5 each ...	10	0	0
	29 Subordinate Officers @ Rs. 2 each	58	0	0
3	Annual subscription for 1918—1919 from 32 new members @ Re. 1 each ...	32	0	0
4	Subscription from C. E. C. Fischer, Esq., for 1918—19... ...	5	0	0
5	Advertisement charges... ...	36	0	0
6	V. P. M. O. Recoveries... ...	10	13	0
7	Sundry receipts... ...	2	0	0
8	Interest accrued on the deposit in the Bank	16	12	9
9	Cash balance with the treasurer at the commencement of the year... ...	4	9	3
10	Balance at Bank at the commencement of the year... ...	506	3	6
	Total...	894	6	6

Expenditure.

Items	Particulars	Amount Rs.	As.	Ps.
1	Paper and Printing charges for Numbers 1, 2 and 3 of Vol. III. ...	186	1	7
2	Stationery etc.	4	0	0
3	Postal charges	36	2	0
4	Conveyance charges	1	6	0
	Total ...	227	9	7
	Add Cash balance with Treasurer ...	43	12	8
	Add balance at Bank, including interest accrued on the deposit	623	0	3
	Total...	894	6	6

G. Viswanatham *Editor and Treasurer.*	M. Umapathi Mudaliar, *Asst. Editor.*	E. M. Crothers, *Manager.*	F. Cowley-Brown,. *President*

THE MAGAZINE
OF THE
Madras Forest College.
Published Quarterly.

Subscriptions.

Subscriptions per annum Re. 1/- and an entrance donation of Rs. 2/- for students of the College.

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It is the aim of the management to run the magazine for the Ranger-class (including Deputy Rangers) and mainly by their contributions. Correspondents are needed to supply suitable matter to maintain the magazine on these lines. We feel confident that this appeal will not go in vain. There must be a number of our readers who have something of interest to write on.

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